

JOURNAL OF CREATION

Vol. 33(1) 2019 ISSN 1036-2916 CREATION.com

**POPULATION EFFECTS
OF LONG-LIVED PATRIARCHS**

**AN ACCURATE AND COMPLETE
OLD TESTAMENT CHRONOLOGY**



**1751 OUMUAMUA—
INTERSTELLAR OBJECT
FROM A YOUNG GALAXY?**

**CRITIQUE OF THE LATEST
EVOLUTIONARY MODELS**

**DEEP-TIME IN 18TH-CENTURY FRANCE:
IMPACT ON GEOLOGY AND EVOLUTION**



JOURNAL OF CREATION

An international journal devoted to the presentation and discussion of technical aspects of the sciences such as geology, biology, astronomy, etc., and also geography, archaeology, biblical history, philosophy, etc., as they relate to the study of biblical creation and Noah's Flood.

COVER: Artist's impression of interstellar object 1I/2017 U1, Oumuamua

IMAGE: ESO/M. Kornmesser

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CREATION.com

**Printed in Australia,
 Published by:
 Creation Ministries International Ltd**

ABN 31 010 120 304



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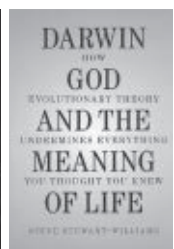
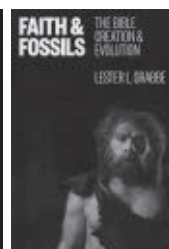
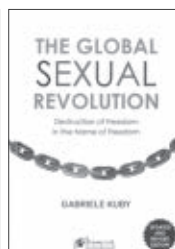
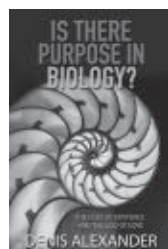
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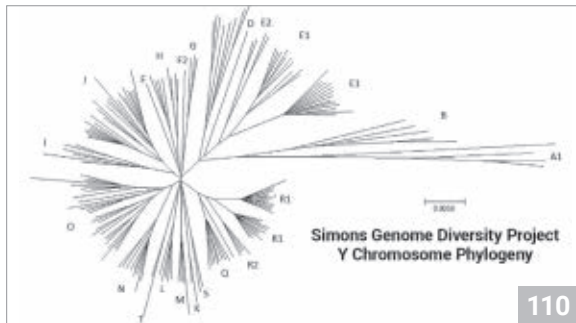


Yedomas, a special type of permafrost that contains a large amount of organic matter, are evidence for only one ice age.

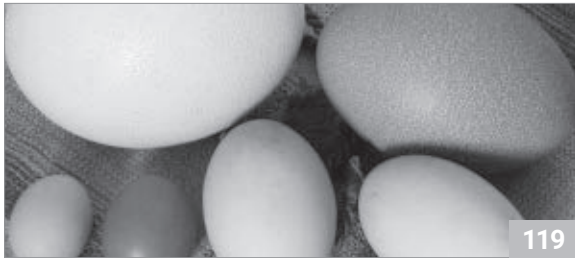


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Due to patriarchal mutations, the 'molecular clock' would have ticked much faster in the first few centuries after the Flood than it does today.



The egg is an excellent example of irreducible complexity because every feature is required for it to function.

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- » The scientific aspects of creation are important, but are secondary in importance to the proclamation of the Gospel of Jesus Christ as Sovereign, Creator, Redeemer and Judge.

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More evidence for the reality of genetic entropy—update

Robert W. Carter

Several years after the publication of “A new look at an old virus: patterns of mutation accumulation in the human H1N1 influenza virus since 1918”¹ and the follow-up publication in *Journal of Creation*,² some detractors are arguing that the analysis was invalid. Specifically, they are claiming that the human H1N1 influenza virus is still making people sick, and thus the claim that it went ‘extinct’ in 2009 was wrong. This was an intriguing thought. Maybe the human H1N1 virus had still been circulating but was missed by major epidemiological laboratories worldwide? To get at the root of this, I re-did the original analysis and extended it to include all H1N1 viral genomes reported to date.

Every available H1N1 virus that had infected both human and swine as of 18 October 2018 was retrieved from the Influenza Research Database.³ Some sequences had to be removed due to quality control issues. Specifically, sequences with many Ns (i.e. missing data) tended to also be more diverged. This indicated the existence of poor-quality data. I culled every viral genome with more than five Ns. Also, some sequences were incomplete or missing one or more genomic segments.

There was a group of six consecutively named sequences from patients in New Zealand who were co-infected with the swine and human versions in 2009. These came from a study that claimed to have discovered reassorted viruses (genetically recombined swine and human H1N1) in several patients, even though other studies of

a similar nature had failed to detect any reassortment.⁴ They also claimed the reassorted viruses did not spread to any other person. No other such ‘hybrid’ version can be seen in the massive database of viral genomes, and they left no viral descendants, so they were removed from the analysis.

The final dataset included 10,372 complete genomes that spanned 100 years of sampling.

I created an alignment for each of the eight genomic segments, trimming any sequence before the start codon or after the final stop codon and manually adjusting for indels. These were concatenated and entered into a single FASTA file, one line for each viral genome, totalling 13,133 nucleotides each. Distance was calculated by tabulating the number of differences compared to the 1918 strain (figure 1). The A/Brevig Mission/1/1918 strain is used as a reference for segments 1–3 and 5–8. The A/South Carolina/1/18 strain was used as a reference for segment 4 (see reference 1 for details). Occasional gaps and a few

places where the sequence included an ambiguous letter call (e.g. an ‘S’ in a sequence indicated the letter was either a G or a C) were not counted as differences. There were no ambiguous calls in the reference sequence. Due to heavy sampling during specific years and in specific localities, there were many identical and near-identical sequences among the data. A pairwise comparison of all sequences was performed. If any pair differed by 10 or fewer nucleotides, the second member (alphabetically by strain name) of each pair was removed. This created a subset of 6,360 sequences with a minimum distance of 11 mutations. A neighbour-joining phylogenetic tree was created from a FASTA file of this subset in MEGA (version 7),⁵ then rooted to the 1918 strain (figure 2).

Results

As before, a clear break between the ‘human’ and ‘swine’ versions of the H1N1 virus can be seen (figure 1). This was caused by the accidental

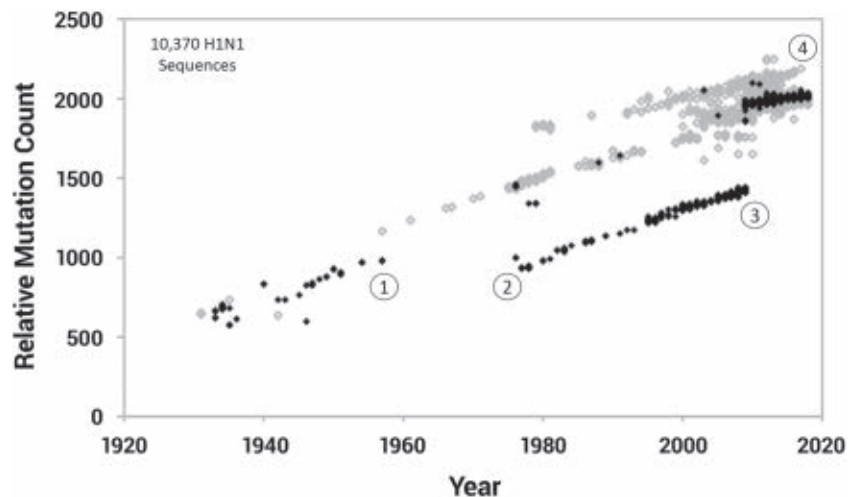


Figure 1. Number of mutations since 1918 occurring in all H1N1 viruses infecting humans (dark diamonds) and swine (light diamonds) reported in the Influenza Research Database through late 2018. (1) The human H1N1 lineage goes extinct for the first time in 1957. (2) The human H1N1 reappears in 1976 after an accidental release in Moscow. This creates a disjunction in the trendline and allows for easy visual separation of the swine and human versions. Sporadic swine H1N1 infections occur in humans between 1976 and 2009. (3) The human H1N1 virus disappears from reporting in March 2009, the same year the swine H1N1 goes pandemic in humans. We first reported this in 2012. (4) Six years later, all currently circulating H1N1 viruses infecting humans derive from viruses the same distance removed from the 1918 strain as a subset of the main swine version.

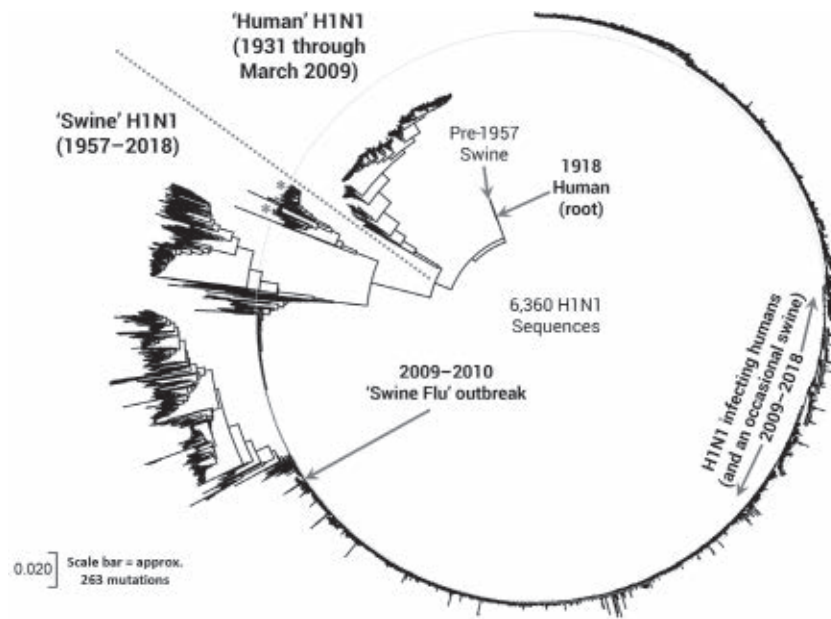


Figure 2. A phylogeny of human and swine H1N1 influenza. The tree is rooted to the 1918 strain. The 'human' branch is clockwise to the right of the dotted line. The 'swine' branch is counterclockwise to the left. Sporadic infections of humans by the swine version (asterisks) were reported over the years, but it was not until the 2009–2010 'swine flu' pandemic that this version became common in humans. All currently circulating H1N1 viruses infecting humans are derived from the 2009–2010 pandemic viral strain. A thin grey circle was added to help the reader see how the genomic distance from the original 2009 outbreak viral genome increases over time in the long arm leading to the 2018 viral genomes.

re-release of the virus in 1976 after being frozen in a sample dating back to approximately 1952.⁶ One can see occasional 'swine' H1N1 infections in humans over the years, and a huge burst after the 2009–2010 swine flu pandemic. In fact, from figure 1 it appears that *all* modern H1N1 infections in humans trace back to the swine version. It also suggests that the human version went extinct.

This is confirmed in figure 2, where we see that every H1N1 reported in humans since early 2009 traces back to the swine version. Indeed, the human version is clearly extinct after nearly a decade of non-reporting.

Discussion

Genetic entropy is supported by strong theoretical work, powerful numerical simulations, and real-world examples. The H1N1 virus is not immune to the effects of genetic

entropy and we see major strains either weakening or disappearing entirely over time. This comes after decades of natural selection failing to remove thousands of incremental errors in the genome.^{1,2} Also, new viral lines have appeared suddenly, sometimes with significantly more mutations than comparable contemporaneous strains. These can be seen in the data presented here. This might be an example of the 'mutator strain' hypothesis of Carter, Lee, and Sanford.⁷ Or perhaps sudden mutation surges are part of the long-term history of the H1N1 virus, but this would make it even more prone to genetic entropy.

What is in store for the H1N1 virus? Over time, it should continue to accumulate mutations faster than selection can remove them. It should continue to become more and more attenuated and, barring an infusion of fresh genetic elements from a wild strain currently circulating in aquatic

waterfowl, it should eventually meet its demise. Only the future can tell.

References

1. Carter, R.W. and Sanford J.C., A new look at an old virus: patterns of mutation accumulation in the human H1N1 influenza virus since 1918, *Theor. Biol. Med. Model* 9:42, 2012; tbimed.com/content/9/1/42.
2. Carter, R.W., More evidence for the reality of genetic entropy, *J. Creation* 28(1):16–17, 2014; creation.com/evidence-for-genetic-entropy.
3. Influenza Research Database, fludb.org.
4. Sonnberg, S., *et al.*, Pandemic seasonal H1N1 reassortants recovered from patient material display a phenotype similar to that of the seasonal parent, *J. Virology* 90(17):7647–7656, 2016.
5. Tamura, K., Stecher, G., Peterson, D., Filipski, A., and Kumar, S., MEGA6: Molecular evolutionary genetics analysis version 6.0, *Molecular Biology and Evolution* 30:2725–2729, 2013.
6. Nakajima, K., Desselberger, U., and Palese, P., Recent human influenza A (H1N1) viruses are closely related genetically to strains isolated in 1950, *Nature* 274:334–339, 1978. See also reference 1.
7. Carter, R.W., Lee, S., and Sanford, J.C., Overview of the independent histories of the human Y-chromosome and the human mitochondrial chromosome; in: Whitmore, J.H. (Ed.), *Proceedings of the Eighth International Conference on Creationism*, Creation Science Fellowship, Pittsburgh, PA, pp. 200–216, 2018.

Yedomas show one ice age

Michael J. Oard

Secular scientists continue to claim that there were dozens of Pleistocene ice ages of various intensities. The number has climbed over the years from one when the Ice Age was discovered in the mid-1800s, to four ice ages in the late-1800s to mid-1900s, to about 50 in the 2000s.¹

The astronomical theory of the ice ages fuelled multiple ice age ideas

The shift from one to four ice ages was based on flawed research done in the northern foothills of the Alps² and the United States' Mid-West.³ Geologists then 'saw' about four ice ages almost everywhere for 60 years. This is a good example of how the reinforcement syndrome works. The original research gets accepted as foundational and thus biases subsequent research. The results are tailored to support the 'foundational' research.⁴ Ice Age expert D.Q. Bowen comments:

"Indeed it could be said that force-fitting of the pieces into pre-conceived pigeon-holed classification is what is almost a way of life for the Quaternary [Ice Age] worker Tendencies to oversimplify in this way lead to new discoveries being forced into a pigeon-holed classification. Such arbitrary methods tend to perpetuate an illusion of security and precision in an apparently repeated confirmation of the original model. This tendency to confirm discoveries from limited amounts of data has been called The Reinforcement Syndrome by Watkins (1971), who cites the classical four-fold Alpine

subdivisions of the Pleistocene as an example."⁵

A revival of the astronomical theory of the Ice Age caused this shift from four to eventually 50 ice ages. It started from a paradigm-changing 'verification' of the astronomical theory of the ice ages by Hays and colleagues.⁶ The astronomical theory has since been assumed as fact, and has been used extensively for Ice Age research and dating pre-Ice Age strata. A new reinforcement syndrome was established.

Numerous problems with the astronomical theory

Recently, Jake Hebert from the Institute for Creation Research has shown that, because of the changed date for the last magnetic reversal, the paper by Hays and others does not support the astronomical theory.^{7,8} The changed date resulted in the Hays *et al.* deep-sea cores not having the 'correct' frequencies calculated for the astronomical cycles. So, the theory really has not been proven. The astronomical theory has numerous

other flaws.⁹ The mechanism is too weak to cause ice ages.¹⁰⁻¹² For instance, the main 100 ka eccentricity cycle has extremely little change in the distribution of solar radiation over the earth, yet an ice age requires a lot of change. So, research predicated upon the astronomical theory of the ice ages, including thousands of papers, is flawed, even by uniformitarian reckoning. One wrong premise most often leads to wrong conclusions.

Evidence strong for only one ice age

Glaciers move and deposit rocks and soil in unique ways. These deposits provide abundant evidence for only one ice age. Sequences in some areas can be interpreted as from multiple glaciations, such as at the boundary of ice sheets. However, these areas could just as easily be seen as the deposits of multiple pulses from one glaciation. For instance, researchers from the University of Alberta at Edmonton, Canada, have scaled back the number of ice ages in western Alberta from around four to just one.^{13,14} Moreover,



Figure 1. Permafrost thaw hollows and ponds due to local melting of permafrost on Baffin Island, Canada

Image: Steve Jurvetson/CC BY 2.0

Table 1. Five of the most significant evidences against multiple ice ages

1) Generating even one uniformitarian ice age is climatically very difficult
2) Most glacial debris is from the 'last' ice age
3) Loess is mainly from the 'last' ice age
4) Driftless areas north of the ice sheet boundary should not exist
5) Extinctions happened mainly after the 'last' ice age, why not in the previous ones?

the volume of loess (wind-blown silt) from the Pleistocene also suggests only one ice age, since it displays one period of loess deposition associated with the 'last' ice age.^{15,16} Table 1 presents the arguments in favour of just one ice age.

Yedomas in Siberia, Alaska, and the Yukon

Just recently, another indicator of just one ice age has emerged. Yedomas are a special type of permafrost that contain a large amount of organic matter (about 2% carbon by mass) and from 50 to 80% ice by volume.¹⁷ The ice is in the form of large ice wedges and ice layers and lenses. Permafrost covers 23 million km², or 24%, of land in the Northern Hemisphere. Yedomas cover substantially less—1,387,000 km² in north-east Siberia, Alaska, and Yukon Territory of north-west Canada.¹⁸ They are often tens of metres thick with a maximum of about 50 m. Permafrost was 52% greater at the peak of the Ice Age than today,¹⁷ having expanded south of the boundaries of the ice sheets and subsequently melted back toward higher latitude.

Because of subsequent thawing of yedomas, likely during the warming after the disappearance of the Cordilleran, Laurentide, and Scandinavian ice sheets,¹⁷ hollows formed on the yedoma surfaces leaving behind a hill and basin topography called thermokarst (figure 1). Sometimes mass wasting, the downslope spreading of sediments, occurs during melting. Yedomas contain most of the

woolly mammoths and other animals entombed in the permafrost.¹⁹

Global warming enthusiasts are concerned about the effect the melting ice in the yedomas will have on global warming, since the organic matter is only partially decomposed and will release methane and carbon dioxide into the atmosphere. Thus, the yedomas are called 'Pandora's freezer', since a huge increase in greenhouse gases could act like a 'carbon bomb' and push the climate over a 'tipping point'. This feeds into another paradigm shift.

It is now believed that the climate has 'thresholds', which, once exceeded, plunge the climate into a super warm or super cold state. This belief has the temperature changing up to 10–20°C in a few decades,²⁰ and even as little as 1–3 years!²¹ The idea of 'abrupt climate change' was first fuelled by numerous abrupt changes in the oxygen isotope ratio, assumed proportional to temperature, in Greenland ice cores.²² However, these abrupt climate changes are within the Ice Age portion of the core. They can be attributed to decadal climate fluctuation caused by changes in the amounts of volcanic aerosols in the stratosphere within the biblical Ice Age model.²² So, abrupt climate change during the Ice Age does not apply to today's climate.

Practically all the organic matter in yedomas is from plants with much of it grass and sedges,²³ supporting Guthrie's contention that the non-glaciated lowlands of Siberia, Alaska, and the Yukon were part of the

Northern-Hemisphere-wide 'mammoth steppe'.²⁴

The origin of yedomas is a bit of a mystery. The sediments are primarily loess,¹⁷ but there is also a minor amount of fluvial and lacustrine sediments. Of interest to creation science is that yedoma permafrost is *not* forming today, which violates the uniformitarian principle, like so many other aspects of geology²⁵:

"Yedoma deposits are ancient deposits and there is no known recent accumulation. ... Yedoma accumulation ended in most places abruptly at the late Pleistocene-Holocene transition ... , when thermokarst processes rapidly began reconfiguring local hydrology and deposition/erosion patterns."²⁶

Yedomas also show one ice age

Of particular interest to creation science is that the yedomas only formed during the 'last' ice age:

"Yedoma deposits started accumulating during the last ice age. No older yedoma deposits older than the last interglacial (MIS-5e; 130–115 thousand yrs BP) are described so far (Schirmer *et al.*, 2013)."²⁷

Since, according to the astronomical ice age theory, the next ice age is due soon after the ending of the present Holocene interglacial, there are two reasons why the present-day yedomas and their thermokarst modifications should be preserved and covered over with loess associated with the next ice age. First, since loess makes up the yedomas from the most 'recent' ice age, one would expect by uniformitarian reasoning that yedomas from previous ice ages would also occur. Second, since each ice age is said to be much colder in the polar areas than today, these very cold temperatures would be conducive to the preservation of both the loess and yedomas. So, yedomas from previous ice ages, if real, should have been preserved. Of course, neither

the supposed ‘earlier’ loess deposits or yedomas exist. The preservation of yedomas only from the most ‘recent’ ice age argues against these supposed previous ice ages, supporting the single ice age posited by creation scientists.^{28,29}

Uniformitarian scientists are not without explanations, or further hypotheses, to explain away difficulties. They seem to always paper over a theoretical vacuum that would challenge their paradigms of uniformitarianism, deep time, and evolution. It is no different in the case of the missing yedomas. The researchers claim that the yedomas melt after each ice age:

“We suppose that yedoma deposits degraded during former warmer-than-Holocene (e.g. Tourney and Jones, 2010) interglacial periods [emphasis added].”²⁷

This is a weak response. Yes, the last interglacial is claimed to have been a little warmer than the Holocene.³⁰ However, uniformitarians cannot argue that the other 50 or so interglacials were significantly warmer. This is because they interpret the amplitudes of oxygen isotope ratios from deep-sea sediment cores to be a measure of global ice volume. Because these amplitudes become *smaller* farther back in time, uniformitarians cannot claim that these earlier interglacials were warmer. And could a little more warmth during the most recent interglacial really melt all the ice in the yedomas? If this were the case, the amount of methane and carbon dioxide added to the atmosphere would skyrocket, supposedly causing global warming and no further ice ages. This huge addition of greenhouse gases would show up in the most recent supposed glacial/interglacial fluctuations in East Antarctic ice cores, but it does not.³¹ The ‘interglacial’ rise in greenhouse gases is about the same as in the Holocene before the Industrial Revolution.

If “the present is the key to the past”, many of the 50 other earlier

ice ages would surely have also left yedoma deposits, yet these supposed yedoma deposits do not exist. The straightforward interpretation of the observations is that there was only one ice age.

References

- Walker, M. and Lowe, J., Quaternary science 2007: a 50-year retrospective, *J. Geological Society London* **164**:1,073–1,092, 2007.
- Flint, R.F., *Glacial and Quaternary Geology*, John Wiley and Sons, New York, pp. 643–645, 1971.
- Boellstorff, J., North American Pleistocene stages reconsidered in light of probable Pliocene-Pleistocene continental glaciation, *Science* **202**:305–307, 1978.
- Oard, M.J., *Ancient Ice Ages or Gigantic Submarine Landslides?* Creation Research Society Books, Chino Valley, AZ, pp. 9–17, 1997.
- Bowen, D.Q., *Quaternary Geology: A stratigraphic framework for multidisciplinary work*, Pergamon Press, New York, pp. 7–8, 1978.
- Hays, J.D., Imbrie, J., and Shackleton, N.J., Variations in the earth’s orbit: pacemaker of the ice ages, *Science* **194**:1121–1132, 1976.
- Hebert, J., A broken climate pacemaker?—part 1, *J. Creation* **31**(1):88–98, 2017.
- Hebert, J., A broken climate pacemaker?—part 2, *J. Creation* **31**(1):104–110, 2017.
- Oard, M.J. and Reed, J.K., Cyclostratigraphy, part 3: critique of the Milankovitch mechanism, *CRSQ* (in press).
- Oard, M.J., The astronomical theory of the Ice Age becomes more complicated, *J. Creation* **19**(2):16–18, 2005; creation.com/images/pdfs/tj/j19_2/j19_2_16-18.pdf.
- Oard, M.J., Astronomical troubles for the astronomical hypothesis of ice ages, *J. Creation* **21**(3):19–23, 2007; creation.com/astronomical-troubles-for-the-astronomical-hypothesis-of-ice-ages.
- Oard, M.J., Phase problem with the astronomical theory, *J. Creation* **28**(2):11–13, 2014; creation.com/phase-problems-with-astronomical-theory.
- Young, R.R., Burns, J.A., Smith, D.G., Arnold, L.D., and Rains, R.B., A single, late Wisconsin, Laurentide glaciation, Edmonton area and southwestern Alberta, *Geology* **22**:683–686, 1994.
- Oard, M.J., Only one glaciation observed in western Alberta, Canada—the ice-age reinforcement syndrome, *J. Creation* **29**(2):12–13, 2015.
- Van Loon, A.J., Lost loesses, *Earth-Science Reviews* **74**:309–316, 2006.
- Oard, M. J., Loess problems, *J. Creation* **21**(2):16–19, 2007.
- Strauss, J. et al., Deep yedoma permafrost: a synthesis of depositional characteristics and carbon vulnerability, *Earth-Science Reviews* **172**:75–86, 2017.
- Strauss, J., Schirrmeister, L., Mangelsdorf, K., Eichhorn, L., Wetterich, S., and Herzschuh, U., Organic-matter quality of deep permafrost carbon—a study from Arctic Siberia, *Biogeosciences* **12**:2227–2245, 2015.
- Vereshchagin, N.K., The mammoth ‘cemeteries’ of north-east Siberia, *Polar Record* **17**(107):3–12, 1974.
- Pausata, F.S.R., Legrande, A.N., and Roberts, W.H.G., How will sea ice loss affect the Greenland ice sheet? *EOS Transactions of the American Geophysical Union* **97**(9):10, 2016.
- Hammer, C., Mayewski, P.A., Peel, D., and Stuiver, M., Preface to special volume on two Greenland ice cores, *J. Geophysical Research* **102**(C12):26315–26316, 1997.
- Oard, M.J., *The Frozen Record: Examining the ice core history of the Greenland and Antarctic ice sheets*, Institute for Creation Research, Dallas, TX, 2005 [available on print on demand].
- Schirrmeister, L., Grosse, G., Gul, Wetterich, S., Overduin, P.P., Strauss, J., Schuur, E.A.G., and Hubberten, H.-W., Fossil organic matter characteristics in permafrost deposits of the northeast Siberian Arctic, *J. Geophysical Research: Biosciences* **116**(G2):1–16, 2011.
- Guthrie, R.D., *Frozen Fauna of the Mammoth Steppe: The story of Blue Babe*, The University of Chicago Press, Chicago, IL, 1990.
- Oard, M.J. and Reed, J.K., *How Noah’s Flood Shaped Our Earth*, Creation Book Publishers, Powder Springs, GA, 2017.
- Strauss et al., ref. 17, pp. 76, 79.
- Strauss et al., ref. 17, p. 78.
- Oard, M.J., *Frozen in Time: Woolly mammoths, the Ice Age, and the biblical key to their secrets*, Master Books, Green Forest, AR, 2004.
- Oard, M.J., *The Great Ice Age: Evidence from the Flood for its quick formation and melting*, Awesome Science Media, Canby, OR, 2013.
- Ganopolski, A. and Robinson, A., The past is not the future, *Nature Geoscience* **4**:662–663, 2011.
- Cuffey, K.M. and Patterson, W.S.B., *The Physics of Glaciers*, 4th edn, Elsevier, New York, p. 657, 2010.

Breccia pipes in the Grand Canyon change our understanding of its origin

W.R. Barnhart

The Grand Canyon in the western US is where many of the cherished ideas of long-age geology were developed and are illustrated. Teachers, tour guides, and park rangers standing on the Canyon's rim or in a lecture hall routinely recite the layers, inserting their long-age assumptions. Creation geologists recognize that these assumptions of age are totally contrary to the Bible's account of Noah's Flood. But, do we realize that the physical evidence also contradicts the secular geological explanation of breccia pipes?

The Grand Canyon breccia pipes are chimney-like structures a few tens to hundreds of metres across filled with heat-altered breccia starting in the Redwall or Mauv Limestone and tunnelling upwards as far as the Chinle Formation (figure 1) some 800–1,400 m (2,600–4600 ft) above. There are over 1,300 breccia pipes or possible breccia pipes located on the Colorado Plateau in and around Grand Canyon (figure 2).¹ Two are well-known locations to many visitors. The Last Chance Mine, which operated from 1892–1907, was a copper mine in the Grandview breccia pipe. The current top of that pipe exits the Redwall Limestone near the neck of Horseshoe Mesa, with a second entrance at the bottom of the Redwall entering the lowest level of the mine. The second, the Orphan Mine, operated from 1893–1953 as a copper mine, and from 1953–1969 as a uranium mine.

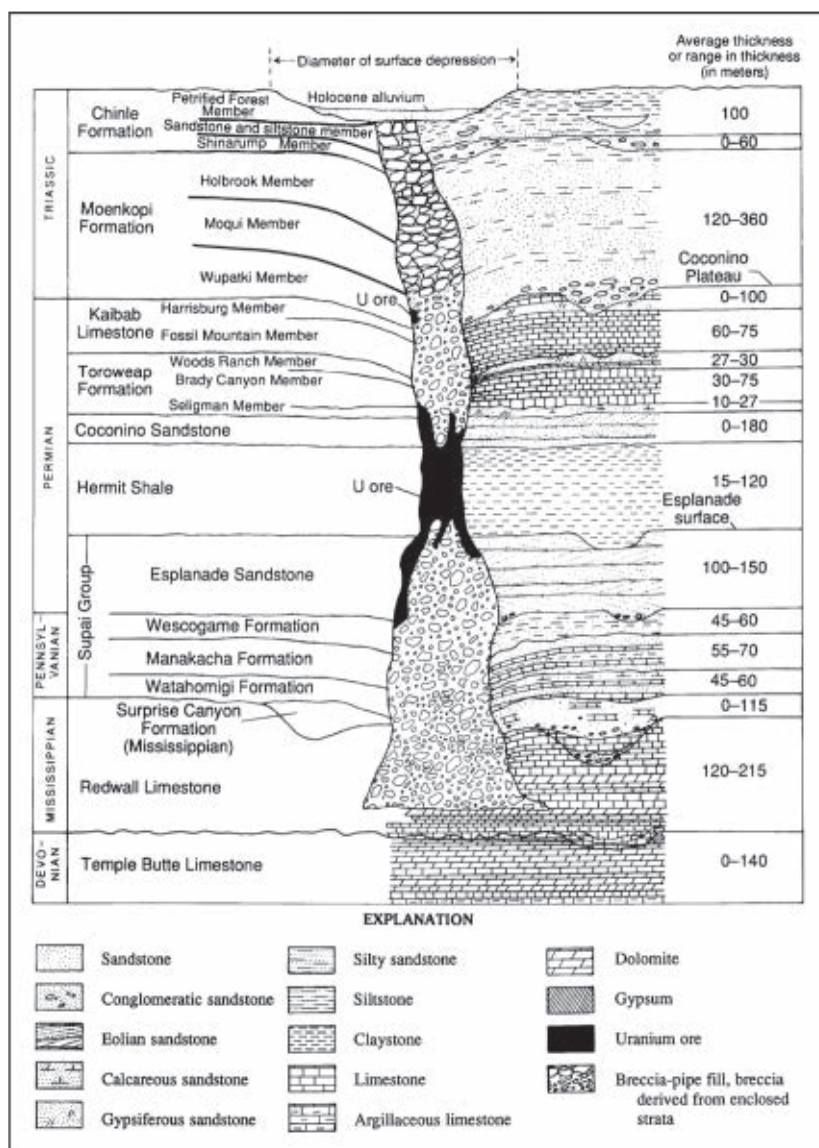


Figure 1. Commonly used cross section of a breccia pipe. Schnebly Hill Formation only occurs in the Sedona area (after Wenrich and Aumentodreski¹⁵).

The Orphan Mine is also in a breccia pipe, located between Maricopa and Powell Points, with the mine tunnels extending under Powell Point. While concentric layering in the Orphan breccia pipe can be seen extending upwards, the mine operated primarily in the Supai Formation, where both copper and uranium ore are believed to be secondary minerals to the breccia pipe's formation.

Secular researchers routinely refer to the pipes as “solution-collapse” structures.² However, this basically

just assumes they are of a geologically recent origin while largely ignoring their mechanisms of formation. However, this is not consistent with the evidence.

Secular model of breccia pipe formation

The standard secular explanation for the origin of the breccia pipes on the Colorado Plateau may stem from the 1880s major collapse within

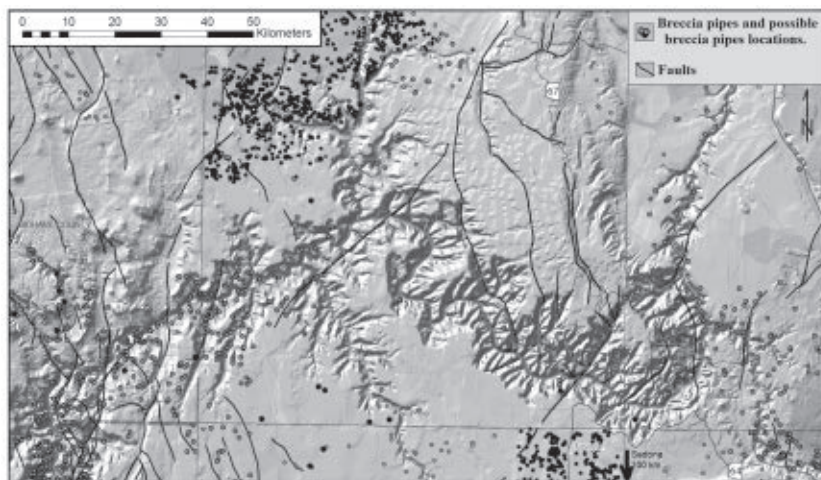


Figure 2. Locations of breccia pipes and possible breccia pipes in north-western Arizona, US. Sedona is 100 km to the south of arrow. (From Spencer *et al.*¹)

the Hermit Shale of Devils Kitchen Sinkhole at nearby Sedona, Arizona.³ They are believed to have developed in steps. First, karst caves formed in the Redwall Limestone. Next, these caves grew through collapse of the very thick overlying sandstone of the Supai, then moving up into the more poorly cemented Hermit Shale. Eventually, the invading water is believed to have allowed chimneys to grow through

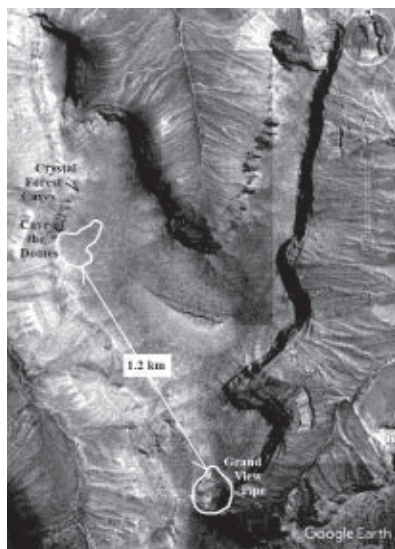


Figure 3. Google Earth image of Horseshoe Mesa showing the relative location of the Grandview breccia pipe, Cave of the Domes, and Crystal Forest Caves (2017, 36.024689 N, -111.977408E; accessed 25 May 2018).

all of the strata until they emerged at ground level as a sinkhole. Based on two pipes near the western edge of the Colorado Plateau, some caves are believed to have extended downward from the Redwall into Mauv limestone beneath.⁴

However, there are several problems with this model for breccia pipe formation:

1. Many of the layers that the pipes go through are sandstone and do not have any appreciable limestone to dissolve.
2. No known cave system in the Redwall Limestone extends below the midway point of the formation. Rather, they are restricted to the upper Redwall, but at least the two in the Mauv had to originate below the midway point of the Redwall.
3. Existing cave systems form horizontally, yet the Orphan and Grandview breccia pipes are vertical chimney structures with very little horizontal spreading.
4. Breccia in the pipes and large collapsed blocks in sinkholes are not similar types of rubble. Breccia are sub-rounded cobbles or smaller, and collapse blocks are 5–9 m³ (200–300 cu ft) of solid sandstone.
5. Existing caves and pipes show no connection, emphasizing that they

must have formed at two different times.

6. Observed shapes of sinkhole interiors do not match the funnel shape in the country rock around the tops of all known pipes and many sinkholes.

When an entire breccia pipe is seen that does not end in a sinkhole, its chimney extends upwards through several formations (figure 1). Throughout much of the Colorado Plateau, that extension includes at least four separate 12+ m thick sandstones in the Supai and the extremely thick Coconino sandstone.⁵ Karst caves do not form in sandstones.

In Horseshoe Mesa's limestone there are four caves (figure 3). The Cave of the Domes is large, and the three Crystal Forest Caves are much smaller. Some of the three Crystal Forest Caves are thought to be connected. However, none of them connect with Cave of the Domes through any sizable passage, although they are at apparently the same level of the limestone, and none connect to any known breccia pipe (figure 3). Most of the known canyon caves are isolated and do not form larger networks. All canyon caves occur on a fairly level horizontal plain. Many karst caves do form at several levels (Carlsbad Caverns, New Mexico; Mammoth Caves, Kentucky), but they do not have the hollow-tube-chimney form that the Grandview and Orphan breccia pipes exhibit.

The breccia samples from pipes exhibit other differences from the blocks of rubble from Devils Kitchen Sinkhole collapse. The rocks that fell in the 1880s and 1989 cave-ins were large angular blocks of red sandstone. However, breccia in the two pipe's mines are small (1 mm to 25 cm, 0.04 in to 10 in) sub-rounded pieces of white or dark-brown sandstone and limestone. A calcite coating may turn a cobble white on the outside, but turning red sandstone to white or dark brown on its inside requires considerable heat (350–400°C, 650–850°F minimum⁶) to



Figure 4. Stylolites in Mississippian Limestone of Indiana. Very similar stylolites occur in the Redwall Limestone.

change the red iron oxide to partially reduced (brown) or free (white) iron.⁷

Rethinking the Redwall formation in Flood geology

Some researchers have claimed that the Redwall Limestone formed in a significant depth of water.⁸ However, liquid water could not exist at the temperatures associated with turning the red sandstone white or brown.^{6,7} As such, a rethinking of the formation of the Redwall is needed.

It appears the Redwall experienced a high-temperature compaction event. Stylolites (figure 4) form where significant collapse results from pressure.⁹ This is usually modelled as a dissolution event accompanying dewatering.¹⁰ But, it could also have resulted from the collapse of the calcispheres, small rounded ‘fossils’¹¹ making up a high proportion of the Redwall Formation that were part of the original depositional form of the Redwall’s limestone.¹² Calcispheres form as a loose crystallized structure¹³ compressing into much less space at high temperatures. There is also strong evidence in the Redwall’s chert that it was deposited as silica peloids with microcrystalline limestone inclusions.⁸ Additionally, McKee and Gotschick found limestone and dolomite alternating and intertonguing even to the grain level.⁸ Such close association between chert, limestone, and dolomite without even microscopic pathways

for water to carry magnesium or silica for replacement suggest they each precipitated as crystalline aggregates or spherical clusters of crystals, much like snow changes from flakes to hail pellets, and did not go through lengthy diagenetic chertification and dolomitization.

Collapse is a gravity-driven process, with seismic movement stimulating additional compaction where gravity-driven processes prevail. With temperatures too great to allow liquid water involvement,^{6,7} the breccia pipe chimneys have many characteristics of gas escape structures, where gases developed inter- or intra-strata and then pushed their way through the non-lithified material while it was in a plastic phase.

Examining the top of a breccia pipe as illustrated in figure 1, all post-Redwall layers slope down into the pipe. This is also true for Devils Kitchen Sinkhole, where the Schnebly Hill Formation slopes down to meet the Hermit Formation over half of the breccia pipe’s circumference¹⁴ forming half of a funnel. Wenrich and Aumentemodreski remark that the funnel-shape depression is a good way of locating potential breccia pipes which lie concealed under alluvium that has collected in the depression.¹⁵ The Orphan Mine pipe is a bowl of concentric fractured rings inside and outside the pipe. In contrast, the Grandview pipe atop Horseshoe Mesa is a small hill. This suggests gases escaped as the Canyon was forming, but very close to the timeframe of the deposition of the Kaibab and Chinle Formations. When bubbles of gas were released, the top was exposed approximately where it is today, and the funnel formed immediately. That means pipes now ending at the surface in the Kaibab or Chinle, had Kaibab or Chinle exposed when they erupted. This may suggest a short timespan between the deposition of these formations and formation of the canyon. This also suggests breccia

pipes offer specific time constraints to both the deposition and the erosion processes that limits them drastically.

The sinkholes in the Sedona area all show a ‘bell’ shape in the brecciated top of the pipe³ when the gas was stopped by a thick layer that had cooled beyond its plastic stage. That cooling may have accelerated when immediate erosion exposed it to the atmosphere or surface water. Nonetheless, at present this is speculative, and the basis for this will need further elucidation.

Creation implications

The breccia pipes suggest a catastrophic origin for both the pipes themselves and the surrounding sedimentary rock. To account for outgassing, all the relevant layers, many of which extend for hundreds of kilometres, would have been deposited in mere hours. The breccia pipes themselves would have formed in *minutes*. The timing, scope, and destructive force implied by these breccia pipes suggests only one event can explain them: the global Flood of Noah.

References

1. Spencer, J.E., Wenrich, K.J., and Cole, T., *Partial database for breccia pipes and collapse features on the Colorado Plateau, northwestern Arizona VI.0*, Arizona Geological Survey Digital Information, D1-42, repository.azgs.az.gov/uri_gin/azgs/dlio/1634, 2015.
2. Wenrich, K.J. and Sutphin, H.B., *Lithotectonic setting necessary for formation of a uranium-rich solution-collapse breccia-pipe province, Grand Canyon region, Arizona*, Open-File Report, 89-0173, US Geological Society, Denver, Colorado, 1989.
3. Lindberg, P.A., *Sedona sinkholes and groundwater flow: the geological history of their evolution*, Arizona Geological Survey Contributed Report CR-10-C, p. 5, 2010.
4. Wenrich and Sutphin, ref. 2, p. 2.
5. Esplanade and Coconino Sandstones are over 100 m (330 ft) thick in mid Canyon, but vary widely over the Colorado Plateau.
6. 350°C is where Si starts to become mobile, and 850°C is where the limestone starts to calcine. Satyendra, Calcining of Limestone, ispatguru.com/calcination-of-limestone, 2 May 2013.
7. Iron compounds start to break down about 1,000–1,100°C (experiment with ceramics kiln), except hematite requires excess of 1,400°C.

8. McKee, E.D. and Gotschick, R.C., *History of Redwall Limestone of Northern Arizona*, Geological Society of America, Memoir 114, 1969, cites the water depth at 3–4 m (10–12 ft) (p. 569), but most Flood modellers, referring to Genesis 7:17–20, put the depth in excess of ‘15 cubits upwards’.
9. Carrio-Schaffhauser, E., Raynaud, S., Latière, H.J., and Mazerolle, F., Propagation and localization of stylolites in limestones; in: Knipe, R.J. and Rutter, E.H. (Eds.), *Deformation Mechanisms, Rheology and Tectonics*, Geological Society Special Publication No. 54, pp. 193–199, 1990.
10. Railsback, L.B., Lithologic controls on morphology of pressure-dissolution surfaces (stylolites and dissolution seams) in Paleozoic carbonate rocks from the mideastern United States, *J. Sedimentary Petrology* 63(3):513–522, 1993.
11. These may in fact be better called ‘chemical precipitates’ or ‘condensates’. However, secular researchers refer to them as ‘fossils’ assuming they are somehow of biological origin, like most oolites are assumed to originate. However, this is at present speculative, and needs further research.
12. Hess, A.A., *Chertification of the Redwall Limestone (Mississippian), Grand Canyon National Park, Arizona*, M.Sc. Thesis, University of Arizona, p. 85, 1985.
13. Kazmierczak, J. and Kremer, B., Early post-mortem calcified Devonian acritarchs as a source of calcispheric structures, *Facies* 51:554–565, 2005.
14. Lindberg, ref. 3, pp. 6, 9.
15. Wenrich, K.J. and Aumentemodreski, R.M., Geochemical soil sampling for deeply buried mineralized breccia pipes, northwestern Arizona, *Applied Geochemistry* 9(4):431–454, 1994.

Oumuamua— what is it?

Wayne Spencer

Since 19 October 2017 there has been much interest in an unusual object known as Oumuamua (pronounced ‘Oh mua – mua’, Hawaiian for a “messenger from afar who came first”). It is now considered to be the first known case of an interstellar object that has passed through our solar system. Some have asked whether an object like this poses a problem from a young-age creation perspective. Oumuamua was discovered by the Pan-STARRS telescope at the University of Hawaii. The Pan-STARRS telescope searches for faint objects such as comets, asteroids, near-earth objects, and transneptune objects.

The Oumuamua object was found to be travelling toward our sun at a very high speed. It was following a hyperbolic trajectory, which means its orbit about our sun was not closed, but open. It flew by our sun and left our solar system in another direction, making a sharp turn as it passed by

the sun. Such an object will pass us by once and will likely never be seen again. There has been debate among scientists regarding what this object is and about its origin. Oumuamua’s official designation was changed twice after its discovery. It was first treated as a comet and named C/2017 U1.¹ Its orbit is somewhat similar to the Halley Type comets because its trajectory toward the sun was a highly inclined path and it left on another highly inclined path. Soon after it was given this designation, scientists found that it did not give off any dust or water, unlike comets. So, it was then named A/2017 U1 like an asteroid.^{1,2} It has been estimated that out in space, before it came near the sun, it was travelling at approximately 26.4 km/s (kilometres per second).³ Its approximate top speed as it passed near our sun was 87.3 km/s.³ Then as it travelled away from the sun its speed was approximately 38.3 km/s.³ Eventually, as new information came in on the object, it was given a new kind of designation. Thus its official designation is now 1I/2017 U1, which classifies it as an interstellar object. This makes it the first object in this new classification.



Figure 1. The round dot in the centre of the image is Oumuamua. The image was captured by the William Herschel telescope in the Canary Islands on 28 October 2017. The background stars appear streaked because the telescope is tracking on Oumuamua, which is moving at high speed.

Oumuamua has another peculiar characteristic. It seems to be a very long narrow object, often described as cigar-like. An object like this is only a very faint point of light and the outline of the object cannot actually be seen. However the variation in brightness as it tumbles in space generally gives a hint of its proportions. The brightness of Oumuamua varies by a factor of 10 over a period of just under four hours. The European Southern Observatory (ESO) estimated its rotation period at 7.34 ± 0.06 hours.⁴ The Gemini South telescope in Chile was used to obtain spectroscopic data on Oumuamua. The object's colour and spectrum is most similar to carbonaceous asteroids, such as the C-Type or D-Type asteroid classes.⁴ Estimating the size is uncertain for a faint object such as this. A NASA article estimates its length at up to 400 m, and its width 40 m.³ Some other sources estimate it as smaller, such as the National Optical Astronomy Observatory in Tucson, Arizona, which estimated it to be 180 m in length.⁵ These should only be taken as very rough estimates. Its shape is however a significant puzzle for naturalistic formation models. Accepted naturalistic planetary and solar system models always involve small bodies forming by colliding and sticking together. But a long narrow object would be vulnerable to being broken apart if it were in an environment with many other rocky objects near it colliding with each other. Some researchers have proposed such an object could form from an exoplanetary system in which a planet came too near a star and was torn apart by tidal forces.^{6,7} Dense stars or binary star systems might accelerate rocky fragments into interstellar space.

Where does it come from?

Oumuamua's trajectory followed a hyperbola, rather than an ellipse. This has prompted speculation as to

its origin. Its speed is indeed consistent with an object coming from outside our solar system. If an object from within our solar system were propelled away from the sun by a planet flyby, for example, it could still be on an elliptical orbit, meaning it would return again. But if it were propelled outward at high enough velocity, it would escape the sun's gravity and continue on in interstellar space on a hyperbolic trajectory. An object on a hyperbolic trajectory leaving our solar system cannot return. Asteroids and comets can sometimes be propelled away from the sun by Jupiter or Saturn. Since Oumuamua followed a hyperbolic path moving toward our sun, there is a good possibility it came from between the stars in our galaxy. Scientists tend to assume that it had to come from a star and form by some naturalistic process. But this assumes a history for the object that cannot actually be known. If it did form by naturalistic models and travel across space it could require millions of years to cross space. This is based on considerations of the direction that Oumuamua was coming from as it approached the sun.¹

Scientists have proposed that other stars could have their own 'Oort clouds' of comet reservoirs just as ours is alleged to have. These 'Oort clouds' occasionally would lose comets to interstellar space. Also, many small bodies could be 'lost' into interstellar space in the early stages of the formation of any planetary system, by today's accepted models. Forming planets, especially large ones similar to Jupiter, can propel small bodies away at high speed if they pass by it near the planet. If this were happening around many nearby stars, there should actually be many interstellar comets (or rocky objects) crossing space. Astronomers have searched for interstellar comets for years and have considered it puzzling that they have not been seen with some regularity.^{8,9} In 1993, two scientists estimated that

for every comet "trapped in the Oort cloud, there should be 30–100 comets lost into the interstellar medium".¹⁰ Note that this quote is only considering our own solar system. This comes from theories on how the Oort cloud would form and how the Oort cloud would randomly lose objects into interstellar space over time. The same issue could exist for other star systems regarding rocky objects that would be deflected outward into interstellar space. However the estimates of rocky objects in interstellar space would be lower. All of this is how today's scientists view how there could be objects between the stars of our galaxy.

But now there is one possible example of an observed interstellar object. This may be taken by some as confirming modern theories. However modern theories have a problem with explaining why, if the galaxy and our solar system are billions of years old, is there only one such object? Oumuamua is not like comets in its composition and it is not like asteroids in its shape and proportions. It will be interesting to see if more rocky or comet-like objects like Oumuamua are seen in coming years. Some scientists have assumed that interstellar objects have always been passing through our solar system but we just haven't had instruments sensitive enough to see them. But even without the best modern sensitive detectors, some interstellar objects would likely be visible as they pass near the sun, as Oumuamua has.

A creation perspective

A possible creationist approach to explaining such an object is to suppose it was simply supernaturally created out in interstellar space when the galaxy was created. This would be on Day 4 of Creation Week. We don't know what objects may be out in interstellar space between the stars. If Oumuamua were created in

interstellar space, this would mean it did not have to form from collisions and it did not have to cross the entire distance between another star and our sun. It could have been moving roughly in sync with the galactic spiral arms until it wandered near our system. There may be evidence of this published in a relatively new scientific publication. The American Astronomical Society started a new publication called *Research Notes of the American Astronomical Society*. This is a non-peer-reviewed publication with short reports from researchers. In 2017 a report by Mamajek in this publication elaborated on the motion of Oumuamua in relation to the galaxy. Oumuamua's velocity was estimated prior to coming near our sun and compared to the overall motion of the galaxy and that of the Local Standard of Rest (LSR) of nearby stars. Mamajek states the following (NB his letters U, V, and W refer to galactic polar coordinates):

“When the velocity is compared to the local stars, ‘Oumuamua can be ruled out as co-moving with any of the dozen nearest systems, i.e. it does not appear to be associated with any local exo-Oort clouds (most notably that of the Alpha Centauri triple system) ... ‘Oumuamua is remarkable for showing both negligible radial (U) and vertical (W) motion, while having a slightly sub-Keplerian circular velocity (V; by ~11 km/s). These calculations strengthen the interpretation that A/2017 U1 has a distant extrasolar origin, but not among the very nearest stars. Any formation mechanism for this interstellar asteroid should account for the coincidence of ‘Oumuamua’s velocity being so close to the LSR.”¹¹

Scientists have also suggested Oumuamua is a ‘young object’ (in their old-age timescale) because certain star regions suggested to be where it

might have come from are at distances requiring only about 150 Ma or less for the object to reach us.¹ This is based on estimates considering the general direction it came from. Though it is possible to project backward along its orbit, this is not precise enough to confidently identify which star it may have come from. The stars within the galaxy move in the time it would take Oumuamua to cross space. The quote above also implies that Oumuamua is not of the expected velocity range to have originated from one of the nearby stars. Instead it was essentially moving with the flow of the galaxy until it came near our system. So if the galaxy and the solar system are billions of years old, why is it that there is only one observed example of an interstellar object? Considering our solar system and our galaxy to both be young may help explain Oumuamua. However we should wait and see what else may be discovered about interstellar objects.

Naturalistic old-age assumptions are not so reasonable as many are led to believe. We must learn to balance the truth of Scripture with the scientific considerations regarding new discoveries. We can always look forward to the surprising and interesting things God has created for us to discover next.

References

1. Cooper, K., Interstellar interloper, *New Scientist* **237**(3163):28–31, 3 February 2018.
2. Grossman, L., We still don’t know where the first interstellar asteroid came from, *Science News*, 1 December 2017.
3. Oumuamua, NASA Science Solar System Exploration website, solarsystem.nasa.gov/small-bodies/comets/oumuamua/in-depth/, accessed 1 November 2018.
4. Meech, K.J. *et al.*, A brief visit from a red and extremely elongated interstellar asteroid, *Nature* **552**:378–381, 21 December 2017.
5. A familiar-looking messenger from another solar system, *National Optical Astronomy Observatory News*, NOAO 17-06, 15 November 2017, noao.edu/news/2017/pr1706.php, accessed 22 November 2018.
6. Cuk, M., 11/Oumuamua as a tidal disruption fragment from a binary star system, *Astrophysical J. Letters* **852**(1), article id. L15, 4 January 2018.
7. Rafikov, R.R., 11/2017 ‘Oumuamua-like interstellar asteroids as possible messengers from dead stars, *Astrophysical J.* **861**(1), 28 June 2018.
8. McGlynn, T.A. and Chapman, R.D., On the nondetection of extrasolar comets, *Astrophysical J.* **346**:L105–L108, 15 November 1989.
9. Francis, P., The demographics of long-period comets, *Astrophysical J.* **635**:1348–1361, 20 December 2005.
10. Sen, A.K. and Rana, N.C., On the missing interstellar comets, *Astronomy and Astrophysics* **275**:298–300, 1993.
11. Mamajek, E., Kinematics of the interstellar vagabond 11/Oumuamua (A/2017 U1), *Research Notes of the American Astronomical Society* **1**(1), article 21, 2017.

The origin of laminae in shales

Michael J. Oard

Fine-grained sedimentary rocks, generally called mudrocks or mudstones, make up about 50% of all sedimentary rocks,¹ although estimates vary. These represent various proportions of silt- and clay-sized particles, and are mostly composed of silicate minerals. Mudstones come in great variety, but generally can be broken down into massive mudstone, siltstone, and claystone with a variety of textures. Siltstone is defined as a rock with greater than about $\frac{2}{3}$ silt-sized particles.² A claystone is a mudrock that contains over $\frac{2}{3}$ clay-sized particles.² When the mudstone is laminated it is called shale. Shale is ubiquitous in the rock record (figure 1). There are a variety of shale laminations which are thought to reflect a range of depositional settings. Shales can be quite thick, sometimes up to hundreds of metres, and are usually widespread.³ Shales are commonly believed to have been deposited in distal locations from their source in quiescent, often anoxic conditions.⁴ Of course, under uniformitarian assumptions, any significant mudstone deposit would have taken a long period of time.

The production of the laminae

Uniformitarian scientists have struggled to explain laminations in shale and have suggested multiple mechanisms for their formation.⁵ A new mechanism for forming the shale laminae has recently been proposed, one that is based on flume experiments.⁶ From mixtures of clay and silt of various sizes, the flume experiments were able to reproduce the laminae in currents of 25 cm/sec. Higher currents produced silt layers only. Slower currents allowed the

clay to flocculate up to a few hundred microns in diameter, the size of sand, and remain intact even within the current. The layers then segregated out simultaneously into coarse silt and floccule lags in moving waves or ripples. Fine silt was observed to be incorporated within the clay floccules. The flume produced multiple styles of laminae identical to those observed in natural shales.

In order to explain the origin of laminae, the researchers suggested that the clay floccules at first absorbed all the silt, and as the floccules moved and encountered obstacles, such as smaller floccules, they abruptly slowed down. The inertial forces due to the denser, larger silt grains caused the coarse silt to be dislodged from the floccules. The floccules continued moving in the current while the coarse silt was deposited. The coarse silt built up and started to move as a silt ripple and migrated over the bed. Simultaneously, clay floccules with fine silt inclusions grew to equilibrium size and then formed migrating floccule ripples. Thus, moving ripples leave behind a thin lag of alternating coarse silt and clay deposited simultaneously. Whether this complicated mechanism

is the real reason for the formation of laminae remains to be seen. Upon compaction, most of the evidence of the ripples becomes destroyed.⁵ The experiment demonstrated shales can form in water that moves fast enough to transport sand. The experiment proved that laminations were not necessarily deposited in calm water.

Implications

The flume experiments cannot of course reproduce the exact natural deposition of all shale rocks which would be of much larger scale both horizontally and vertically. But, the experiments do demonstrate that coarse silt and clay separate out simultaneously in a current fast enough to transport sand. Calm conditions and slow deposition are unnecessary. The separating layers in a current are similar to what creation scientist Guy Berthault discovered in his flume experiments. He observed that a moving current laid down repeated fine layers when the sediment contained particles of different shape, size, and mass.⁷

Creation scientists still need to account for thick, widespread layers



Figure 1. Thin-bedded black shale just below the contact with the Lewis Overthrust, north of Marias Pass, Montana

of shale in the rock record, but secular researchers have come *part way* in showing laminae can form rapidly in a moving current. It is possible that moving water loaded with silt and clay can deposit multiple laminae quickly.

Numerous surface and internal waves in currents during the Flood may help.^{8–10} Internal waves are gravity waves below the surface that propagate on a boundary between two density-stratified layers or propagate when a water current flows over an underwater barrier. These internal waves are common in the oceans today⁹ and cause erosion, transport, and redeposition of sediment. With the catastrophism of the Flood, one would expect innumerable internal waves. These discoveries bring us one step closer to explaining how fine-grained sedimentary rocks were deposited during the year-long global Flood.

References

1. Boggs, Jr., S., *Principles of Sedimentology and Stratigraphy*, 5th edn, Prentice Hall, New York, p. 118, 2012.
2. Pettijohn, F.J., *Sedimentary Rocks*, 3rd edn, Harper and Row, New York, p. 290, 1975. Clay is less than 1/256 mm and silt is between 1/16 mm and 1/256 mm.
3. Boggs, ref. 1, p. 122.
4. Potter, P.E., Maynard, J.B., and Depetris, P.J., *Mud and Mudstones: Introduction and overview*, Springer-Verlag, New York, 2005.
5. Yawar, Z. and Schieber, J., On the origin of silt laminae in laminated shales, *Sedimentary Geology* 360:30, 2017.
6. Yawar and Schieber, ref. 5, pp. 22–34.
7. Berthault, G., Analysis of main principles of stratigraphy on the basis of experimental data, *Lithology and Mineral Resources* 37(5):509–515, 2002.
8. Macquaker, J.H.S., Bentley, S.J., and Bohacs, K.M., Wave-enhanced sediment-gravity flows and mud dispersal across the continental shelves: reappraising sediment transport processes operating in ancient mudstone succession, *Geology* 38:947–950, 2010.
9. Pomar, L., Morsilli, M., Hallock, P., and Bádenas, B., Internal waves, an under-explored source of turbulence events in the sedimentary record, *Earth-Science Reviews* 111:56–81, 2012.
10. Oard, M.J., Internal oceanic waves and sedimentation, *J. Creation* 27(1):16–18, 2013.

Long-distance transport of sediments

Michael J. Oard

Secular scientists are sometimes forced by evidence into some radical conclusions that defy their own starting assumption—uniformitarianism or present processes. For instance, it was discovered in recent decades that large amounts of sand and other sediments likely were transported for thousands of kilometres over a wide area from their presumed source. Creation scientists have been pointing out the implications of such transport.^{1–4}

Sand transport for thousands of kilometres

In 1992, Rainbird *et al.* deduced that sands in sandstones from various areas of north-west Canada mostly originated from south-eastern North America, travelling from one side of North America to the other.⁵ The sediments analyzed were originally deposited in two arcuate Precambrian basins—the Mackenzie and the Amundsen basins. These basins contain thousands of metres of sedimentary rocks, ‘dated’ from about 1.5–1.7 Ga. Portions of the basins have uplifted into mountains, where the sedimentary rocks can be sampled. The paleocurrent directions in the sandstones are also consistently from the south-east, supporting their conclusions.



Figure 1. One possible configuration of the supercontinent Rodinia showing mountain uplift (converging arrows) on Laurentia and Baltica caused by continental collisions that occurred during the Grenville orogeny. Eroded sediments are carried across the two continents (longer arrows with tributaries). (From Rainbird *et al.*⁶, p. 1409.)

In their original research, Rainbird *et al.* used few samples. However, in their most recent research they used many more,⁶ and obtained the same results (though more local sources were found in the lowest sandstones just above the upper crustal igneous and metamorphic rocks). They found sand grains embedded throughout considerable thicknesses of strata, over 4,000 m thick in the Amundsen Basin, likely originated from the area of the Grenville orogeny and other faraway Precambrian terranes near the Appalachian Mountains, about 3,000 km away. They emphasize that the ‘river’ or ‘rivers’ that flowed toward the north-west were at least *1,200 km wide!* This is “much wider than any modern fluvial system on Earth”.⁷

The Grenville orogeny supposedly occurred about 1.5–0.98 Ga when the supercontinent Rodinia was formed by continental collision. According to paleomagnetic data (mainly from apparent polar wander paths), this is claimed to have taken place along about 4,000 km of crustal convergence of Laurentia with presumably Amazonia, which currently resides in South America (figure 1).⁸ Hence, the size of the mountains in the Grenville orogeny are believed to have been at least the height of the Himalayas, which supposedly represent only 2,000 km of shortening. The Grenville mountains have since eroded away; most of their ‘roots’ are found in south-east Canada and the north-east United States, with a few root areas extending south-east into Texas.

Basis for long-distance claim

Rainbird *et al.* claim that the sand had travelled such long distances based on the ‘ages’ of zircon crystals in the sand. This field of study is called provenance analysis, which is the attempt to reconstruct the source of sediments for a particular sedimentary feature under investigation. Dating

of zircons is only one method used in provenance analysis. The method involves separating out numerous zircon crystals from the sand and dating them by the U-Pb method, which has become very efficient and cost effective. Since transported sand can originate from almost anywhere, the variable zircon dates are thought to indicate the specific Precambrian terranes from which the sand eroded. The dates can be highly variable, but they usually cluster into discrete ‘age bins’. These age bins are then believed to reveal the source of the zircon crystals, and hence the sand and other sediments. Secular scientists have worked out age bins associated with major Precambrian terranes across the continents.

Many of the dates in north-west Canada give ages that coincide with the Grenville orogeny. Other dates are thought to indicate origination from other faraway terranes.

Grenville-age zircon dates are also found in basins of north-east Canada, east Greenland, Svalbard, Scotland, and Norway.^{9–11} These are also attributed to the erosion and transport north and east from the Grenville orogeny after the supercontinent Rodinia was assembled and the Grenville mountains formed.

Sandstones of south-west North America and Alberta also mostly from Grenville orogeny

Not only are the sand and other sediments of north-west North America believed to have originated from eastern North America, but so are most of the sands in south-west North America and Alberta.¹² These sandstones range in age, based on uniformitarian assumptions, from Neoproterozoic (1,000–542 Ma) to Mesozoic (252–66 Ma), and most are assumed to have been deposited by wind. However, there is substantial evidence that the sands were deposited from water,¹³ but this is unacceptable

to uniformitarian thinking because it would involve cataclysmic water flows. Neoproterozoic and Cambrian strata in the south-west United States and north-west Mexico are believed to come from the Grenville orogeny. This is supported by the predominant paleocurrent directions for the strata coming from the east.¹⁴ In this case, the nearest Grenville terrane is in Texas about 1,000–1,500 km away.

The huge Permian and Jurassic ‘eolian’ sandstones on the Colorado Plateau of the south-west United States are believed to have blown in from the north, as far as Canada, according to paleocurrent directions. Nearly half of the original sand is believed to have been transported 1,000–2,000 km from the east, from around the Appalachian Mountains.^{15–17} Rainbird *et al.* think this westward-transported sand was then picked up by northerly winds and spread into south-west United States. Most of the upper Paleozoic sands from Grand Canyon are also thought to have come from the Appalachian region and been spread by large rivers.¹⁸ Some of the strata from the western Canadian Sedimentary Basin in Alberta are also deduced to have come from the Grenville orogeny and the Appalachian area.¹⁹ It appears all the sandstones (as well as other sediments) from north-west Canada to north-west Mexico originated from the eastern part of North America.

Unfortunately for the secular model, evidence for their postulated ancient transcontinental rivers does not show up in the sedimentary rocks of middle North America.²⁰

Implications

Assuming the ages of the Precambrian terranes accurately reflect a relative chronology, the uniformitarian conclusions are radical. They defy explanation by presently occurring processes, the common assumption behind uniformitarianism. The greatest challenge uniformitarians

face is explaining how parallel flowing rivers can transport sand over 3,000 km over a width of thousands of kilometres (figure 1). Adding to their difficulties is the thickness of the sediments thus transported, such as those in the Mackenzie Basin, which has sedimentary rocks several thousand metres thick. When one considers the sedimentary material transported from north-west Canada into the south-west United States, a staggering amount of sediment was transported across North America. Furthermore, by uniformitarian reckoning, this sediment probably only represents a small amount of that transported, since rivers normally deposit only a small fraction of their load along their path.

A much better explanation, if we can trust the relative dates, is that the sand and other sediments were transported westward long distances over wide areas during the Genesis Flood. This evidence is better explained by wide, fast water currents picking up the sand and depositing it during the Flood. All this sediment in western North America transported from eastern North America does imply a large mountain uplift in the east.

Such Precambrian activity also raises the question of where to locate the pre-Flood/Flood boundary. Are possible mountain uplifts in eastern North America, and the transport to deep basins in western North America—exceeding 3,000 km of transport at their greatest—an activity that occurred on Day 3 of Creation?²¹ On Day 3, the dry land appeared, which does not necessarily imply uplift and erosion. Since Creation Week involved supernatural activity, I suspect that there was no tectonic uplift, erosion, transport, or deposition at that time. But if such geological activity did occur, the Bible also states that on Day 3 vegetation sprouted on the land. Such long-distance transport of sediment would have to be extremely rapid and finished for vegetation to also sprout on Day 3 over most of North

America, which seems unlikely. It also seems unlikely that this level of activity could occur during the pre-Flood period because one would not expect such powerful erosion and long-distance transport from high mountains with accumulations in thousands of metres of sediment between Creation and the Flood. Rather, it seems this cataclysmic sediment transport would better fit the early part of the Genesis Flood.²²

The arcuate shape of the southern and eastern parts of the Mackenzie and Amundsen basins is also intriguing, and may indicate impact cratering. Impacts are expected to form saucer-shaped craters that fill with sediment, some of which would be expected to later rebound.²³ The Precambrian has many intriguing types of sedimentary rocks and features, such as banded iron formations and large greenstone belts, that need to be incorporated into biblical Earth history. The location of the pre-Flood/Flood boundary is a key to solving such questions about earth history, and is an issue that needs further research.

References

1. Froede Jr., C.R., Eroded Appalachian Mountain siliciclastics as a source for the Navajo Sandstone, *J. Creation* 18(2):3–5, 2004.
2. Snelling, A.A., Sand transported cross country, *Answers* 3(4):96–99, 2008.
3. Reed, J.K. and Froede Jr., C.R., Provenance studies of clastic sediments and their role in a hydrodynamic interpretation of the Genesis Flood, *CRSQ* 46(2):109–117, 2009.
4. Oard, M.J., Colorado Plateau sandstones derived from the Appalachians? *J. Creation* 23(3):5–7, 2009.
5. Rainbird, R.H., Heaman, L.M., and Young, G., Sampling Laurentia: detrital zircon geochronology offers evidence for an extensive Neoproterozoic river system originating from the Grenville orogen, *Geology* 20:351–354, 1992.
6. Rainbird, R.H., Rayner, N.M., Hadlari, T., Heaman, L.M., Turner, E.C., and MacNaughton, R.B., Zircon provenance data record the lateral extent of pancontinental, early Neoproterozoic rivers and erosional unroofing history of the Grenville orogen, *GSA Bulletin* 129(11/12):1408–1423, 2017.
7. Rainbird *et al.*, ref. 6, p. 1408.
8. Halls, H.G., Paleomagnetic evidence for ~4000 km of crustal shortening across 1 Ga Grenville orogen of North America, *Geology* 43(12):1051–1054, 2015.
9. Cawood, P.A., Strachan, R., Cutts, K., Kinny, P.D., Hand, M., and Pisarevsky, S., Neoproterozoic orogeny along the margin of Rodinia: Valhalla orogen, North Atlantic, *Geology* 38(2):99–102, 2010.
10. Gasser, D. and Andresen, A., Caledonian terrane amalgamation of Svalbard: detrital zircon provenance of Mesoproterozoic to Carboniferous strata from Oscar II land, western Spitsbergen, *Geological Magazine* 150(6):1103–1126, 2013.
11. Krabbendam, M., Bonsor, H., Horstwood, M.S.A., and Rivers, T., Tracking the evolution of the Grenvillian foreland basin: constraints from sedimentology and detrital zircon and rutile in the Sleat and Torridon groups, Scotland, *Precambrian Research* 295:67–89, 2017.
12. Mulder, J.A., Karlstrom, K.E., Fletcher, K., Heizler, M.T., Timmons, J.M., Crossey, L.J., Gehrels, G.E., and Pecha, M., The syn-orogenic sedimentary record of the Grenville Orogeny in southwest Laurentia, *Precambrian Research* 294:33–52, 2017.
13. Whitmore, J., Strom, R., Cheung, S., and Garner, P., The petrology of the Coconino Sandstone (Permian), Arizona, USA, *Answers Research J.* 7:499–532, 2014.
14. Stewart, J.H., Gehrels, G.E., Barth, A.P., Link, P.K., Christie-Blick, N., and Wruicke, C.T., Detrital zircon provenance of Mesoproterozoic to Cambrian arenites in the western United States and northwestern Mexico, *GSA Bulletin* 113(10):1343–1356, 2001.
15. Dickinson, W.R. and Gehrels, G.E., U–Pb ages of detrital zircons from Permian and Jurassic eolian sandstones of the Colorado Plateau, USA: paleogeographic implications, *Sedimentary Geology* 163:29–66, 2003.
16. Rahl, J.M., Reiners, P.W., Campbell, I.H., Nicolescu, S., and Allen, C.M., Combined single-grain (U–Th)/He and U/Pb dating of detrital zircons from the Navajo Sandstone, Utah, *Geology* 31(9):761–764, 2003.
17. Dickinson, W.R. and Gehrels, G.E., U–Pb ages of detrital zircons in Jurassic eolian and associated sandstones of the Colorado Plateau: evidence for transcontinental dispersal and intraregional recycling of sediments, *GSA Bulletin* 121(3/4):408–433, 2009.
18. Gehrels, G.E., Blakey, R., Karlstrom, K.E., Timmons, J.M., Dickinson, B., and Pecha, M., Detrital zircon U–Pb geochronology of Paleozoic strata in the Grand Canyon, Arizona, *Lithosphere* 3(3):183–200, 2011.
19. Blum, M. and Pecha, M., Mid-Cretaceous to Paleocene North America drainage reorganization from detrital zircons, *Geology* 42(7):607–610, 2014.
20. Lawton, T.F., Small grains, big rivers, continental concepts, *Geology* 42(7):639–640, 2014.
21. Dickens, H., Colossal water flows during early Creation Week and early Flood, *Answers Research J.* 10:221–235, 2017.
22. Oard, M.J. and Reed, J.K., *How Noah's Flood Shaped Our Earth*, Creation Book Publishers, Powder Springs, GA, 2017.
23. Oard, M.J., Large catatonic basins likely of impact origin, *J. Creation* 27(3):118–127, 2013.

Is there purpose in evolution?

Is There Purpose in Biology: The cost of existence and the God of love

Denis Alexander

Lion Hudson Limited, 2018

Philip Bell

Denis Alexander's main argument is that "[evolutionary] biology is not necessarily purposeless as is often assumed" (p. 248). Indeed he says such a belief is irrational (p. 178), but he covers much ground before reaching this conclusion. Most pertinently, the "God of love" of the subtitle, is not touched on until the last fifth of the book (p. 198).

From the outset, the author distinguishes purpose (small 'p') from Purpose (big 'P'), the latter being teleological (and this review keeps to his convention). Atheists such as Daniel Dennett, Peter Atkins, and Richard Dawkins obviously express their "denial of any ultimate reason for the existence of a biological process such as evolution" (p. 14). As a *theistic* evolutionist, Alexander challenges this. He first overviews the history of "the roots of purpose in biology" (chapter 1), chapters 2–4 explore the 'nuts and bolts' of genetics, then he tries in the final two chapters to interweave his evolutionary narrative with Christianity.

Ideas of purpose rooted in history

Alexander first gives an interesting overview of the history of teleology. He reminds us of Aristotle's 'Unmoved Mover' and the polytheist Cicero's (106–43 BC) Stoic philosophy. The Greek Galen (born AD 129) was quite taken with Plato's "craftsman

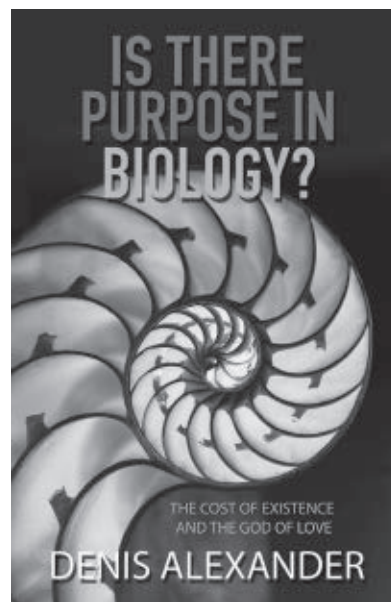
demiurge". He rejected the biblical Creator God, but he did recognize functionality in biology—albeit not an ultimate *telos*. Various Muslim natural philosophers also employed design arguments (p. 28).

During the Middle Ages in Europe, people's idea of 'purpose' in biology was intertwined with allegorical and spiritual meaning. The Protestant Reformation emphasized the literal reading of the Bible. Thus, allegory and the ancient Greek philosophers were disparaged, and a more 'mechanical' view of the cosmos dominated (p. 42). Thus, the narrative of design became prominent, and God's existence and attributes could rightly be inferred from a consideration of His ordered creation.

Scottish philosopher David Hume (1711–1776) challenged this head-on. Voltaire (1694–1778) on the other hand, although a deist, argued for God's existence from the tradition of natural theology. Alexander does inevitably discuss William Paley's famous *Natural Theology*, about which Darwin admitted, "I was charmed and convinced by the long line of argumentation".¹ Still, evolution undermined Purpose from Darwin's point of view:

"But to a large degree it was his theory that killed off any idea of a Broader Purpose for evolution, mainly because of the role that 'chance variation' was perceived to play in his theory and, perhaps even more so, because adaptations engineered by natural selection subverted ... the understanding that complex organs like the eye, the human brain, and so forth were due to God's direct creative action" (p. 52).

Alexander is less objective in his discussion of the post-Darwin



era. Thinking that evolution's reputation suffers from people mistakenly thinking of it as a 'chance process', he strenuously argues that this is wrong. He insinuates that, if enthusiasts for biological design were better Bible students, they wouldn't dangerously engage in 'designer-of-the-gaps' reasoning! With sufficient 'enlightenment' on these topics, so he claims, it is "easy for the Christian community to baptize evolution into the traditional understanding of God as creator" (p. 55).

The big story

The remainder of the book is spoilt by the obligatory assumption of evolution. For instance, "For the first 2.5 billion years of life on Earth, things only rarely got bigger than 1 millimetre across, about the size of a pinhead" (p. 58). Also, "When the need to see more clearly becomes acute during evolutionary history, there is strong pressure to evolve eyes using whatever genomic resources are around to help in the process—it just keeps on happening" (p. 77).

Alexander parades time-worn themes before the reader: the transition



Figure 1. Alexander misapplies the potter and the clay (a well-known biblical metaphor of the Creator and His people) to natural selection and the changing genotype (and thus phenotype) of living organisms.

from unicellular to multicellular life, biodiversity from the ‘Cambrian Explosion’ onwards, Richard Lenski’s ‘bacterial evolution’ experiment with *E. coli*, convergent evolution (pp. 73–90 and much of chapter 3), homology, co-operative behaviour and intelligence in animals. He opines:

“Evolutionary history gives every appearance of being a drama with the late entry of intelligent minds upon the stage, able to investigate and to some extent understand their own history, providing a striking denouement” (p. 68).

This, however, conflicts with Romans 1:20, since there is no need for (thus no reference to) a Creator God in this drama.² Alexander tries to paint an evolutionary picture of increasing biological diversity and complexity over deep time, points to the apparent ‘progress’, and infers that some sort of purpose is at least compatible with evolution.

In fact, he often employs evolution in a general sense (and Neo-Darwinism in particular) as a synonym (substitute?) for the Creator:

“... as animals and plants face the challenges of adapting to different environments, so at independent times and in independent circumstances the evolutionary

process has converged on the same adaptive solution ...” (p. 73).

“Natural selection is like the potter moulding the clay—over a long period of time the consequences of genetic variation are moulded by the potter of natural selection to shape an interbreeding population into a slightly different collection of phenotypes” (p. 172).

This sounds like atheistic evolution-speak. Indeed, why would Alexander use the potter (an intelligent agent) to describe natural selection, especially since Scripture likens *God* to the potter (e.g. Isaiah 29:16; Jeremiah 18:5–6; Romans 9:21)? The Creator moulded Adam from ‘clay’ (Genesis 2:7). If natural processes suffice to explain all biological complexity, why is God needed at all? He becomes an unnecessary hypothesis. Instead, he gives the creature the credit (instead of the Creator; see figure 1):

“To build their eyes, the clever little creatures [dinoflagellates] have stacked lots of mitochondria together to form a cornea-like surface across a lens structure with a membrane network derived from multiple plastids packed together to make up the retina” (p. 78).

Purportedly, opportunity or need (or both) somehow produce evolutionary change:

“But in most cases, there is no intrinsic reason why a particular molecular solution to life’s challenges emerges apart from the fact that it’s so useful to the organism that, once generated, it’s much the best strategy to hang on to it” (p. 138).

“If an adipose fin is the need of the hour, then an adipose fin is what you are likely to get (in evolutionary terms at least)” (p. 90).

This reifies evolution, as if it could weigh up an organism’s needs and strategize. Regarding the adipose fin, one is reminded of Vij Soderá’s aphorism: “What you want you won’t get.”³ Undeterred, Alexander’s faith in evolutionary convergence to work veritable miracles conquers all. “Deep homology” has become trendy, i.e. superficially similar growth patterns and developmental processes (e.g. the pentadactyl limb and hox genes) reflect ancient (deeply rooted) genetic regulatory systems. All are “the fruit of millions of years of selective advantage” (p. 98) rather than design. But convergence is just an ad hoc attempt to explain away biological similarities that *don’t* fit with evolution.

Concerning rapid biological changes observable today (e.g. spines on sticklebacks), Alexander believes these demonstrate that fitness can be increased or decreased at will: “Without such clever ‘evolvability’ living things wouldn’t exist—including us” (p. 124). But if evolution really is that powerful, why bother invoking Purpose at all?

Purpose overarching chance?

In chapter 4, Alexander celebrates Richard Dawkins’ desire to “destroy th[e] eagerly believed myth that Darwinism is a theory of ‘chance’” (p. 141) and explains why, in his view,

the ‘random’ nature of mutations is often misunderstood. He distinguishes “epistemological chance” (that which, though exceedingly complex is law-like, e.g. coin tossing) from “ontological (pure) chance” (where prediction is impossible, e.g. radioactive decay) and “metaphysical chance” (that which is entirely outside the remit of science). He says epistemological and ontological chance introduce variation into genomes. Nevertheless, he emphasizes that, “in both cases the winnowing effects of natural selection are what have the upper hand in bringing about certain constrained outcomes” (p. 172). Furthermore, “the winnowing *necessity* of natural selection generally plays the trump card in the end” (p. 173; emphasis added). Thus, for Alexander, Darwinian evolution is *not really* about chance at all.

Of course, the myriad sources of genomic variation are not truly random—point mutations (SNPs), transposons, gene duplication, structural mutations (those involving larger chromosomal segments than indels), and gene flow (e.g. horizontal gene transfer, retroviral insertions). Mutational hotspots further support this, and many epigenetic alterations are increasingly being implicated in the whole affair. The author rightly acknowledges this but ignores the obvious solution, anathema to any evolutionist, that genomes were *designed* to vary.^{4,5} It is easy to claim that “mutations are caused by molecular mechanisms” (p. 166) but mechanism *requires* design. Similarly, if “Mutation rates have to be ‘set’ just right in different parts of genome to facilitate evolvability” (p. 167), what/who does the setting? Design again, surely? Well no, Alexander says, it’s natural selection.

So where is Purpose in all this? The two sorts of chance he discusses only rise to the level of purpose with a small ‘p’. One simply cannot derive

Purpose from biology, he insists (p. 177); all one can say is that evolution is *compatible* with some sort of overall Purpose. This hardly justifies the conclusion that the atheist claim of the Purposelessness of evolution is ultimately unreasonable, as Alexander contends. As J.P. Moreland rightly states, “God is allowed somehow or other to be involved in the process as long as there is no way to detect his involvement. Design in biology must be unknowable and undetectable!” But, if so, “What, exactly, did God do, and how could we know the answer to this question? If he was ‘involved,’ no one could know it, so God begins to take on some of the characteristics of the tooth fairy.”⁶

Christianizing evolutionary biology?

In his fifth chapter, Alexander presents his vision of “the Christian matrix within which biology flourishes”. It is, however, a case of eisegesis on steroids. As in his previous works, Alexander fondly uses his ‘baptism’ metaphor for shamelessly force-fitting evolution into the Bible. Though he thinks creation doesn’t reveal Purpose (big ‘P’), he is keen on “baptizing evolution ... into a much broader overall Purpose, that provided by Christian faith” (p. 181). He tries to justify himself by claiming that “baptizing evolution into Christian theology is nothing new” (p. 183), later referencing the willingness of Darwin’s churchmen contemporaries, “to baptize the theory of natural selection into the Christian doctrine of creation” (p. 205). However, ‘survival of the fittest’ (a synonym of natural selection) is antithetical to the Gospel—Jesus, the most fit of all (the sinless One), died for the unfit (sinners; Romans 3:23) in order that they would survive eternally.

True theology (rooted in Holy Scripture), whether creation or redemption theology, is the casualty

of Alexander’s eisegesis. But Alexander mainly wants to show that biological evolution fits with his “theological matrix” (p. 206)—what I call his ‘evo-theo matrix’. Having decided that it *is* consistent with his conception of a purposeful God, he describes three overarching Purposes: 1) biological diversity’s great value; 2) the emergence of volitional beings (ourselves); and 3) that this planet is not the ultimate end in view, rather the “new heavens and new earth” (Isaiah 65:7).

One major problem in Alexander’s ‘evo-theo matrix’ is his failure to accept that God’s creative work was “finished” (Genesis 2:1–3)—it is *not* ongoing. Instead, he conflates God’s providential, sustaining work (see e.g. Nehemiah 9:6, Hebrews 1:3) with the idea of ‘continual creation’ by evolution. This makes Alexander relegate the clear statements of divine fiat (“Let there be ...” or equivalent; e.g. Genesis 1:11, 20, 24) to “the language of gracious allowance” (p. 188)! Elsewhere, he acknowledges that the language employed is that of God speaking to create, and that it occurs throughout the Bible (e.g. Psalm 33:6–9; Luke 8:25; Hebrews 11:3) but argues that these accommodate gradual evolution and do not point to “the heavenly engineer” or “designer” (p. 201). He is even happy to try and marry Trinitarian terminology to evolution: “God the Father, God the Son, and God the Holy Spirit are all intimately involved in *creation continua*, the ongoing work of creation” (p. 197).

Never mind how this conflicts with Genesis 2:1–3! Theistic evolution rules and the Bible must conform to it. Astonishingly, Alexander even invokes Jesus’ words about His and His Father’s ongoing “working” (John 5:17) as alleged support for his ‘evo-theo matrix’.

Of course, this sort of thing is sadly typical of prominent theistic evolutionists in general. N.T. Wright,

speaking at the 2017 BioLogos Conference on Christ and Creation, said:

“... if the creation comes through the kingdom bringing Jesus, we ought to *expect* that ... it would involve seed being sown in a prodigal fashion in which a lot went to waste. ... We ought to *expect* that it would be a strange, slow process which might suddenly reach some kind of harvest. We ought to *expect* that it would involve some kind of overcoming of chaos. Above all, we ought to *expect* that it would be a work of utter, self-giving love. That the power that made the world ... would be the power not of brute force, but of radical outpoured generosity.⁷

But the wasteful “strange, slow process” of evolution envisaged here is read *into* Scripture. And how do theistic evolutionists reconcile God’s “self-giving love” with the blind, wasteful, utterly brutal process of evolution? That, of course, is the million-dollar question, and the one which the author attempts to answer in his final chapter.

Death, pain, suffering, and the God of love

Denis Alexander rejects original sin, denying that a historical Fall caused

humanity thereafter to be subject to sin and physical (not just spiritual) death.⁸ Evolution created beings “with the capacity for free will, and so moral choice”. Inevitably, the ‘gospel’ according to Denis Alexander is a confused version of that taught in the Bible:

“But the good news is that Christ through his death and resurrection has opened up a new way to experience Purpose in biology in which we become once again the good carers for creation that God originally intended us to be” (p. 211).

John 3:16 also receives a radical makeover. Noting that ‘world’ in the Greek is *kosmos*, he claims: “Christ came to die for the whole cosmos ... Yes, individuals enter the kingdom as they trust in Christ, but his redemption extends to the whole created order ...” (p. 215).

While it is true that the Bible teaches the redemption of the whole creation itself (Romans 8:21–22; 2 Peter 3:13), this verse does not provide support for that doctrine. The semantic range of *kosmos* is considerable but the context clearly restricts its use to human beings rather than the planet (as some environmentalists favour), let alone the whole cosmos.⁹ Alexander’s ‘novel’ interpretation of Scripture at

this point seriously detracts from the sacrificial love of God for perishing sinners recorded by the Apostle John.

Thinking God used biological evolution to create, how does Alexander resolve the problem of suffering, pain, and death inherent within it? First, he warns his readers not to expect answers that help those struggling with suffering. He says that attempted theodicies are useless in practical terms (certainly true of all those advanced by theistic evolutionists). With this disclaimer, he overviews the various approaches to theodicy that his fellow theistic evolutionists have advanced. Space allows only cursory comment on these theistic evolutionary attempts, but all are futile. Having made God the ‘divine evolver’, no theodicy can succeed in ‘getting him off the hook’.¹⁰

Interestingly, Alexander is uncomfortable with the “hands-off God who allows the ‘free process’ of his creation to have an ‘unscripted adventure’ in which the outcomes are uncertain” (p. 225). He correctly observes that such a being would be just as responsible for death and suffering as “the ‘total control’ God” (p. 221). He thinks a robust Trinitarian theism, with evolution baptized into it, need not duck the challenge but can take it on the chin: “God really is ultimately responsible for all the ‘biological evils’ of the world (but not the moral evils arising from human free will) ...” (p. 228).

On the surface of it, the biblical creationist would agree with this, the crucial difference being that, man having defied God at the Fall, it was God’s prerogative to bring the Curse.¹¹ However, evolution entails that human wickedness is just as contingent upon deep-time Darwinian processes as are animal predation, parasitism, disease, or painful death. Alexander ignores that, but how does he defend God against the charge of employing



Figure 2. Contemplating the ‘evolver god’, creating using the ‘horridly cruel works of nature’, one envisages a ghastly caricature of the God of Scripture.

‘biological evils’—what Darwin called the “horridly cruel works of nature”?¹²

Alexander denies that the creation tells us anything about God’s character. He claims that Romans 1:20 limits the divine attributes that are clearly perceived to God’s power and glory (pp. 228–229). Furthermore:

“The created order is not there to teach us about the character of the creator—we learn that through revelation—but many of its properties are perfectly consistent with the God who has Purposes for the world” (p. 231).

He protests too much. First, the final clause of Romans 1:20 says “they are without excuse”. How can the pagans be *morally* culpable for refusing God His due if creation reveals nothing of God’s character? Paul is surely saying that atheism is simply inexcusable because the created order is telling us something of what the Creator is like, such things as His “eternal power” and “divine nature/Godhead”.¹³

Making evolution God’s responsibility is repugnant. The ‘evolver god’ is a ghastly being, horribly and vastly inferior to the God of Scripture (figure 2). But Alexander’s embracing of evolution and his concomitant rejection of the Fall bite again and again. So, “the mutations that are essential for our very existence because evolution depends on them [his article of faith] can also cause genetic diseases that can kill us” (p. 232). And God, remember, “really is ultimately responsible” for this! The present realities of pain and death are essential components of the “carbon-based life package deal” (pp. 234–238).

What, then, of Jesus healing people during His earthly ministry? If cancer and the host of other human illnesses are not ultimately the result of the Fall, why did the Son of God confront sickness and alleviate human suffering? Alexander answers that it is because these things have no part in the new heaven and earth. Rejecting that these evils have anything to do with

the literal curse of the present creation (Genesis 3), he nevertheless believes in a future new creation without animal predation, pain, suffering, disease, or death, a wholly inconsistent position.

Evolution = no purpose of any kind

The book’s title asks: *Is there purpose in biology?* Moreland, critiquing theistic evolution in general, sums things up well:

“Whether theistic or atheistic, when properly understood, evolutionary theory entails the denial of a scientifically detectable God, and as a result, places the detection of divine design outside of science.”¹⁴

Alexander would agree, but tries to ‘baptize evolution’ into Christianity in such a way that Purpose makes sense anyway. Yet, his vision is deeply disturbing and dissatisfying. William Provine was right:

“Let me summarize my views on what modern evolutionary biology tells us loud and clear, and I must say that these are basically Darwin’s views. There are no gods, no purposeful forces of any kind, no life after death. When I die, I am absolutely certain that I am going to be completely dead. That’s just all—that’s gonna be the end of me. There is no ultimate foundation for ethics, no ultimate meaning in life, and no free will for humans, either.”¹⁵

Alexander, on the other hand, expects his readers to gulp down contorted logic and theological distortion in equal measure:

“Without the physical properties of the world we in fact observe, there would be no life, no evolution, so no free will, no moral responsibility, therefore no sin, no incarnation, no redemptive work of Christ upon the cross for sin, so no resurrection and no possibility of entering into Phase Two, the fulfilled kingdom of God” (p. 243).

Abiogenesis followed by evolution: in Alexander’s vision, these are the foundation upon which *everything* stands. The cost of theistic evolution is high indeed.

References

1. Neve, M. and Messenger, S., *Charles Darwin Autobiographies*, Penguin Books, London, p. 31, 2002.
2. See my discussion of this point in: Bell, P., *Evolution and the Christian Faith: Theistic evolution in the light of Scripture*, Day One Publications, pp. 48–52, 2018.
3. Discussed in Bell, P., Debunking the molecules-to-man myth, *J. Creation* 19(3):45–50, 2005; a review of Soderá’s *One small speck to man: the evolution myth*.
4. Terborg, P., Evidence for the design of life: part 2—Baranomes, *J. Creation* 22(3):68–76, December 2008. Also, Terborg, P., Evidence for the design of life: part 3—an introduction to variation-inducing genetic elements, *J. Creation* 23(1):99–106, April 2009.
5. See Williams, A., Beneficial mutations: real or imaginary?—part 2, *J. Creation* 28(2):75–82, August 2014.
6. Moreland, J.P., How theistic evolution kicks Christianity out of the plausibility structure and robs Christians of confidence that the Bible is a source of knowledge, in: Moreland, J.P., Meyer, S.C., Shaw, C., Gauger, A.K., and Grudem, W. (Eds.), *Theistic evolution: A scientific, philosophical and theological critique*, Crossway, Wheaton, IL, 2017, p. 643.
7. Wright, N.T., plenary session at the 2017 BioLogos Conference, Christ and creation: exploring the paradox, youtube.com, 21 April 2017.
8. Alexander’s views are thoroughly critiqued in chapter 7 (Original goodness?) of Bell, ref. 2.
9. See Bell, ref. 2, pp. 156–157.
10. For a more thorough treatment of the subject, see pp. 42–43 (re: open theism) and chapter 5 (Suffering explained?) of Bell, ref. 2.
11. When God subjected creation to futility (Romans 8:20) as a judgment on Adam’s sin, it was thereafter subject to the bondage to decay. Thus, the biblical creationist has legitimate grounds to distinguish between God being *causally* responsible for the fallen world and being *morally* blameworthy for natural evil. However, the theistic evolutionist who rejects the Fall can make no such distinction.
12. Darwin, C., Letter to Joseph D. Hooker, 13 July 1856, darwinproject.ac.uk.
13. Chapter 2 (Clearly seen) in Bell, ref. 2, is devoted to this crucial discussion of the attributes of God as revealed in creation.
14. Moreland, ref. 6, p. 649.
15. Provine, W.B., Darwinism: science or naturalistic philosophy? A debate between William B. Provine [Cornell University] and Phillip E. Johnson [University of California, Berkeley] at Stanford University, April 30, 1994, *Origins Research* 16(1):9, am.org/docs/orpages/or161/161main.htm.

New book offers comprehensive critique of theistic evolution

Lita Cosner

Theistic Evolution: A scientific, philosophical, and theological critique

J.P. Moreland, Stephen C. Meyer, Christopher Shaw, Ann K. Gauger, and Wayne Grudem (Editors)

Crossway, Wheaton, IL, 2017

This massive, comprehensive book is a hard-hitting refutation of the ideas that evolution has been scientifically proved and that it is compatible with orthodox Christian theology.

An important collaboration

This volume brings together old-earth creationists like Wayne Grudem, Intelligent Design advocates like Stephen Meyer and J.P. Moreland, and young-earth creationists like Matti Leisola and John Currid (one exception to this is James M. Tour, who is often identified with ID, though he prefers not to be—he is, however, a believing Christian who is skeptical of ‘macroevolution’). This is important because it shows that Christians from a wide range of scientific views hold common objections against the idea that we have evolved.

Certainly, biblical creationists understand that the timescale is just as important as the falsity of evolution, and there are moments when the inconsistency of those who hold to an ID or OEC viewpoint comes through. However, having such a unified assault

against a viewpoint that is mutually concerning to all is a definite benefit to the Christian community.

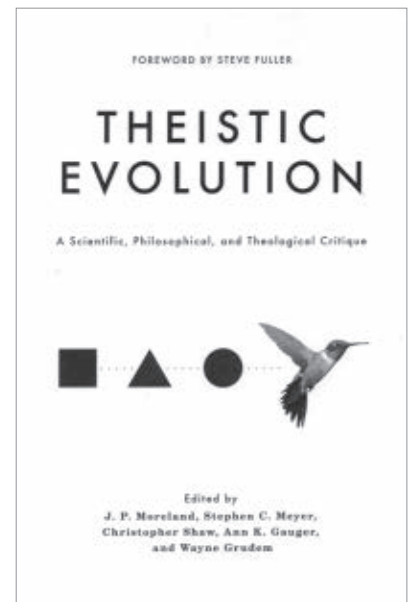
Evolution is not scientifically sound

The volume gives one of the most up-to-date and exhaustive critiques of evolutionary theory available from a scientific point of view.

Douglas Axe points out that accidental processes cannot explain the origin of enzymes: “Life as we see it depends on highly proficient enzymes, all built within cells by linking many amino acids (typically *hundreds*) together in precise sequence” (pp. 84–85). While evolutionist critics have guessed that enzymes could be built up gradually from shorter chains of amino acids, Axe points out that “Scientists who know about enzymes and the various attempts to use selection to enhance them ... *know they can’t back it up!*” (p. 85).

Stephen C. Meyer points out that rather than the fossil record showing a slow and gradual development of life, we see abrupt appearances of new animal types in the fossil record, not just in the Cambrian explosion, but all throughout the fossil record (p. 108). But the problem goes even deeper—“*To build new forms of life from simpler preexisting forms also requires the generation of new information*” (p. 111).

Meyer points out that mutations cannot create this new information.



“It turns out that it is extremely difficult to assemble new genes or proteins by the random mutation and natural selection process because of the sheer number of possible sequences that must be searched by mutations in the available time” (p. 114).

The longer the protein or gene, the more difficult the problem becomes. In fact, “the difficulty of a mutational search for a new gene or novel protein fold is equivalent to the difficulty of searching for just one combination on a lock with ten digits on each of seventy-seven dials!” (p. 117).

James Tour shows that even before one gets to the problem of modifying a living organism, evolution cannot account for the first life. Even organic chemists using intelligence to plan experiments fail 90% of the time (p. 179). Tour details how chemists using expensive equipment in the best labs face challenges in carrying out their experiments. If intelligent agents trying to reach a specified goal usually cannot get a far simpler solution than life from non-life, it shows that random chemical reactions, which are more often than not detrimental to life,

cannot result in the first life even given billions of years.

Winston Ewert shows that even though computer simulations are often argued to support evolution, those very simulations include assumptions that support intelligent design. First, the programs themselves are designed teleologically, like Dawkins' 'weasel' program. This program starts with the correct length of 28 letters, all of which are taken from the English alphabet (p. 204). The large number of 'mutated' copies made maximizes the chances of finding a 'beneficial' mutation. While Dawkins ran the simulation making 100 copies per generation, finding the desired outcome in 43 generations in one run and 64 in another, Ewert ran the simulation with 10 copies per generation, taking 723,232 generations in one attempt and 461,300 in another (p. 205). Furthermore, the string didn't have to make any sense on its own, but simply be closer to the intended outcome. Ewert concludes that "at almost every part of this simulation, teleological fine-tuning was present to guide its target" (pp. 205–206). The same teleological fine-tuning is a critical problem in every computer simulation intended to support evolution.

Jonathan Wells demonstrates that DNA mutations cannot drive evolution, because:

"DNA sequences do not even fully specify RNAs, much less proteins. And the three-dimensional arrangement of proteins in a cell requires information that precedes their synthesis and is specified independently of DNA" (p. 237).

In experiments that search for mutations in the development of a creature,

"Either the embryo manages to overcome the effect of a mutation and develops normally; or the embryo is deformed, often in grotesque ways; or the embryo dies. So to judge from the available

evidence, mutating the DNA of a fruit fly leads to only three possible outcomes: a normal fruit fly, a defective fruit fly, or a dead fruit fly. Hardly the evidence for evolution" (p. 256).

Sheena Tyler shows that embryology challenges evolutionary theory, because embryo development shows signs of intelligent design, rather than evolution. Precise timing is crucial in the development of the embryo, and "It is increasingly untenable to reconcile this as emerging from Darwinian chance processes, or even by the spontaneous self-assembly of organisms according to the laws of physics and chemistry" (p. 325).

The various papers, taken together, provide a compelling argument against biological evolution.

Problems with universal common ancestry and human evolution

Günter Bechly and Stephen Meyer demonstrate that the fossil record does not support universal common ancestry. The fossil record contains huge gaps between different types of organisms, "especially at the higher taxonomic levels (of phyla, classes, and orders) representing the major morphological differences between different forms of life" (p. 339). The major types of creatures arrive suddenly in the fossil record, with very few possible intermediate forms.

Casey Luskin shows how biogeography and the fossil record often do not provide evidence for common ancestry, and shows problems with the different types of phylogenetic trees. Furthermore, vertebrate embryos develop very differently from species to species (contrary to the false picture given by Haeckel's embryos), which is a problem for common ancestry.

Paul Nelson notes that some evolutionists challenge the existence of LUCA (the Last Universal

Common Ancestor; p. 405). He notes that common descent demands that all complex systems in living creatures evolve gradually, step by step, without foresight (p. 418). He further notes that the discontinuities we find in any proposed tree of life mean that we must reject LUCA, and if LUCA doesn't exist, Darwin was wrong (p. 421). Nelson then takes on the law of biogenesis—he states that no evolutionary biologist knows when it began to hold, but for evolutionary theory this could not have always been the case. He argues that the methodological naturalism that excludes intelligence from consideration is flawed.

Three chapters make the case that the line of reasoning for various 'ape-men' is flawed, that humans are unique whether examined on a genetic or a physiological and anatomical level, and propose a genetic case for a special origin of human beings.

Philosophical problems with evolution

Christopher Shaw argues that science has acquired almost religious status and is now trying to answer "the fundamental questions about our origins and the purpose of our existence—questions that once were the subject matter of philosophers and religious scholars" (p. 523). A core tenet of the 'religion' of scientism is "the universe and life arose through cosmic accidents over vast periods of time, and that therefore our human existence has no defined purpose" (p. 524). And even if a scientist should invest in years of training and funds to achieve a coveted university position, this "largely precludes the high risk of proposing new ideas in applications, and most scientists adopt the incremental approach to research which does not attack or question established thinking" (p. 532). Additionally, many scientists

have expressed concerns about the corruption of the peer review system (p. 535). All this means that ‘science’ is far from unbiased.

Stephen Meyer and Paul Nelson argue that methodological naturalism is not a justifiable rule for science, and that Christians should not adopt it (pp. 561–562). Stephen Dilley argues that methodological naturalism is problematic for theistic evolution in particular (p. 593). J.P. Moreland argues that Christians should reject theistic evolution because it “robs Christians of confidence that the Bible is a source of knowledge” (p. 633).

Evolution is not theologically compatible with Christianity

Furthermore, the book details many theological problems with theistic evolution. First, theistic evolution makes God directly responsible for evil, which is something that Christian theologians have never affirmed (p. 683). Theistic evolutionists also cannot account for the origin of emotions and morality (p. 731).

Most crucially, Wayne Grudem shows how theistic evolution undermines several key Christian doctrines. Scripture teaches that Adam and Eve were the first human beings, with no human parents (God having created Adam from the dust and Eve from Adam’s rib). Genesis says that Adam and Eve were created as sinless human beings and became the first sinners. All human beings are descended from Adam and Eve. Furthermore, Scripture teaches that God created the various ‘kinds’ of animals in distinct acts and they were not all descended from a common ancestor, and God rested on the seventh day after creating the world ‘very good’, and thus free from sin (p. 785). Grudem shows how theistic evolution rejects all of these teachings. Furthermore, he shows “A nonhistorical reading of Genesis

1–3 does not arise from factors in the text itself but rather depends on a prior commitment to an evolutionary framework of interpretation” (p. 786).

John Currid explains that theistic evolution is incompatible with the teachings of the Old Testament. He examines five models which incorporate theistic evolution and finds critical weaknesses in all of them. He concludes:

“At base level, the issue is the same as it has been for more than a hundred and fifty years: does one hold to the complete truthfulness of the facts reported for us in Genesis 1 and 2, and especially in the immediate creation of Adam and Eve as the first humans, or not?” (p. 878).

Guy Prentiss Waters shows that theistic evolution is incompatible with the teaching of the New Testament, which regards Genesis 1–11 as historical, and views Adam and Eve as actual individuals who were the ancestors of all people, and particularly of Jesus. He says that “leading proponents of theistic evolution depart from the New Testament writer’s testimony to Adam and Eve, thereby calling into question the historical underpinnings of the gospel” (p. 879). He concludes, “the New Testament writings cannot be accommodated to theistic evolution apart from transforming their teachings in a fundamental fashion” (p. 926).

Gregg Allison explains how theistic evolution is incompatible with historical Christian doctrine. The doctrine that God is the Creator is expressed in the first sentence of the Nicene Creed (p. 928). The Church affirmed creation *ex nihilo* “over against the Platonic idea of the eternality of matter” (p. 929). “This doctrine of creation ... was set in opposition to several prevailing philosophical theories that challenged the belief” (p. 931). In their opposition to ancient atomism, church theologians

rejected the idea that chance processes could form the world (p. 932). He continues by showing that theistic evolutionists must significantly have broken from what was the unanimous interpretation of Scripture in this regard for almost the entirety of church history.

Diversity of viewpoint as both a strength and a weakness

The contributors to this volume have views from young-earth creation, to old-earth creation, to various forms of Intelligent Design. One of the strengths of this book is that all of these viewpoints can successfully argue against evolution from biblical, scientific, and philosophical grounds.

However, young-earth creationists understand that the *timescale* of creation is just as important an issue as whether Adam had human parents. Old earth creationists still have death in the world before Adam’s sin, and they have to deal with human fossils ‘dated’ long before any possible date for Adam. Intelligent Design must still grapple with things that seem like ‘bad design’, which biblical creationists can attribute to the effects of the Fall.

But on the whole this is a very powerful and encouraging resource for creationists, and it is an important response to theistic evolution. It can be expected to rapidly become a standard resource for the person wanting to refute the likes of BioLogos, even though in many ways it does not go far enough.

References

1. jmtour.com/personal-topics/evolution-creation/

A global anti-Christian totalitarian threat

*The Global Sexual Revolution:
Destruction of freedom in the name
of freedom*

Gabriele Kuby

Parousia Media, Sydney, 2017

John Loiterton

The prologue to *The Lord of the Rings* speaks of “the race of men, who above all else desire power”.¹ It is ironic that it takes a work of fiction to so profoundly express to modern man what is clearly revealed in God’s word (Matthew 20:25–27). Human history since the Fall has been a sad story of constant power struggles, and there has been no end of emperors, dictators, and totalitarian regimes.

The 20th century bears ample witness to the terrible costs of totalitarianism, in the forms of Nazism and Stalinism.

Gabriele Kuby has published this book as a warning against “a new totalitarianism that is destroying freedom in the name of freedom” (p. 5; figure 1).² Kuby outlines a new ‘soft totalitarianism’ that appears “light years away from the terror systems of Nazism and Communism” but that is slowly but surely eroding our freedoms, and especially the freedoms of those whose values oppose it, namely Christians (p. 11).

The “21st century’s looming totalitarianism wears a different costume from that of the 20th—no mustache, no jackboots” (p. 283). It is about “a new sexual totalitarianism that seeks to destroy the meaning and reality of marriage and family” (p. 259). It “wears the cloak of freedom, while step-by-step destroying the conditions

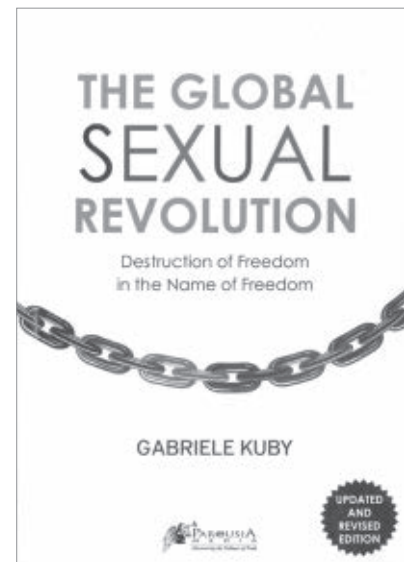
necessary for freedom” (p. 283). But from where does such a destructive force arise, and for what reason? And what exactly is it?

The nature and aim of the threat

Kuby reveals the core of this threat to freedom as an ideology called *gender mainstreaming*. Most of us will not have heard of this term before. This ideology stands directly opposed to the Bible’s teaching that humans are made in the image of God, and in particular is opposed to the revelation that “male and female he created them” (Genesis 1:27). It aims to destroy the gender identity of man and woman and every ethical standard of sexual behaviour. Its tools are gender fluidity, sexual orientation, and the sexualization of children from infancy. Its aim is to destroy the family as we know it, because family is the primary structural element of society. In order to make society malleable and reform it in the image of the ideologues behind this subversive threat, God’s providential instruction to “be fruitful and multiply” (Genesis 1:28), which is the basis of family, must first be opposed.

The origins of the threat

Kuby describes the development of this threat to freedom, from the intellectual trailblazers of the French Revolution through Thomas Malthus, Margaret Sanger, Karl Marx, Friedrich Engels, Alexandra Kollontai, Wilhelm Reich, Magnus Hirschfeld, Sigmund Freud, C.G. Jung, John Watson, Edward Bernays, Bernard Berelson, Alfred Kinsey, John Money, and Simone de Beauvoir, to the 1960s student rebellions and the legal deregulation of sexuality.



The well-justified fight of women for equal rights in the 19th century morphed into a radical feminism that aimed to make the sexes the same and that in the name of ‘equality’ battled against marriage, the family, and the child; against women as mothers, and for complete deregulation of sexuality. And, of course, they supported abortion on demand, while the founding feminists of the 19th century opposed abortion as ‘child murder’.³ This radical feminism wanted to deconstruct the binary sexual identity of man and woman and what they called ‘compulsory heterosexuality’.

This process of social engineering required a new word, “because language does not just reflect reality; it creates it” (p. 46). The binary word *sex* thus gave way to imposing a new meaning to the word *gender*, previously a grammatical term. ‘Gender’ had the flexibility to be defined as desired.

The pioneer of post-modern gender ideology is Judith Butler (figure 2), who is a member of the Rockefeller and Guggenheim foundations and honorary doctor of the Swiss University of Fribourg. Her 1990 book *Gender Trouble: Feminism and the subversion of identity*⁴ is the foundational work on gender theory.



Figure 1. Gabriele Kuby, author of *The Global Sexual Revolution*



Figure 2. Judith Butler, pioneer of post-modern gender ideology

If Butler's views had been expressed in simple words, they might have been dismissed as fanciful, but because she clouded her destructive ideas with highly philosophical terminology that was hard to understand, her ideas were accepted. In essence, Butler was saying that there were no such things as 'men' and 'women' and that sex is a fantasy we believe because we are told it is so. For Butler, identity is solely a function of a gender and sexual orientation chosen by the individual and thus flexible, changeable, and diverse.

The illusion of two sexes is created by the 'incest taboo' and by use of words like *man* and *woman* and must be eliminated in favour of free self-invention. The concepts of man and woman, marriage and family, father and mother, sexuality and fertility, and of heterosexuality as the norm must be destroyed.

The development of the threat

Kuby emphasizes that whilst revolutions have generally been 'bottom up' from the masses, the current sexual revolution is top down from the globally active power elites. The United Nations (UN) has been at the forefront as it has changed from its earlier emphases. The UN's 1948 *Universal Declaration of Human Rights* expressed universal moral values derived from the Judeo-Christian image of man. Article 16(3) proclaimed that the "family is the natural and fundamental group unit of society and is entitled to protection by society and the State."⁵

Over the course of a few short decades, starting with the collapse of communism in 1989, the UN has changed dramatically. Today, Kuby states:

"... the UN and its powerful sub-organisations fight for dissolution of men's and women's sexual identity, elimination of marriage and the family, for dividing the generations through autonomous 'children's rights', for doing away with sexual morality, and for abortion as a 'human right'" (p. 53).

An important step in the implementation of gender mainstreaming was the development of the *Yogyakarta Principles* (YPs).⁶ As Kuby explains:

"A group of 'renowned human rights experts', having no official authorization or legitimation, formulated these principles in 2007 at a conference in Yogyakarta, Indonesia. In March of that year, they presented them to the public

at the UN building in Geneva to lend them a glow of authority. The YPs are a 'new tool for activists'" (p. 68).

The YPs are furnished with a 200-page handbook called *An Activist's Guide to the Yogyakarta Principles*,⁷ which translates the YPs into political action. The YPs' authors apparently see human rights as merely a tool for enforcing the YPs worldwide and the *Activist's Guide* shows how cultures that oppose this can be revolutionized.

The primary goals are acceptance of non-heterosexual (LGBTI+)⁸ behaviour and dissolution of binary sexual identity. Additional goals are homosexual 'marriage' with adoption rights and privileges for LGBTI people.

The implementation of the threat

In order to foist on the majority a subversive agenda aimed at undermining it, obfuscation is required. This includes tactics such as presumption of false legitimacy, manipulation of terms and the false pretence of accord with international law.

Methods of implementation include hollowing out of national sovereignty, financing of LGBTI organisations by the UN and European Union (EU), test cases in the name of human rights, public demonstrations, media influence, implementation of the LGBTI agenda in the school system, training the bureaucracy, curtailment of freedom of contract, curtailment of freedom of speech, suppression of non-compliant information, and even criminalization of opposition.

Another major step in implementation has been getting the EU onto the gender bandwagon. In 2006, former Soviet dissident Vladimir Bukovsky warned of a new totalitarianism in the EU based on a massive lack of democracy in its bureaucratic structure, referring to the EU as "a 'monster' that must be destroyed ... before it develops into a full-fledged totalitarian

state.”⁹ The EU has adopted a new human rights document that no longer mentions men and women in the context of marriage and family. The European Parliament has 20% of its members representing LGBTI rights, totally out of proportion with the 2% of the population that is homosexual. The Directorates General (similar to ministries) are promoting this agenda, together with new agencies such as the Fundamental Rights Agency and the European Institute for Gender Equality. The European Parliament and the Council of Europe regularly pass laws aiming to impose new definitions of marriage and family on recalcitrant member states, which, interestingly, tend overwhelmingly to be ex-communist states.

Implementation is primarily through political activism. Typically, a conference introduces gender mainstreaming as a political strategy and guiding principal. This is followed by a signed statement committing to gender justice as a constituent element of democracy. It is then embedded in policies and employment guidelines, with provisions for education of experts. This then leads to public education.

In politics, the media, universities, foundations, the courts, business, schools, and day-care, gender mainstreaming then becomes the path to post-modern progress. This process is very well entrenched in Western Europe, Canada and parts of Latin America, for example, but countries such as Australia are in the early stages of implementation with the new Same Sex Marriage legislation and Safe Schools curriculum.

The process is that gender mainstreaming becomes the ruling ideology and no one can oppose it without being shunned, defamed, and silenced with accusations of ‘discrimination’ and ‘hate speech’.

This process hinges on the political rape of language in which the meaning of words is corrupted. One of the first casualties of totalitarianism is

the freedom to publicly challenge the threat. Every totalitarian regime controls the media, but here we see something new: a subversive control of language. Language exists to express reality, and thus can be used to represent reality other than as it is. Poets and novelists do this in an agreed manner accepted by their readers. But to turn words into false labels that misrepresent the content of the package is a form of deception. When political dictators do this, we call it *propaganda*. But now we have something more subtle; an alteration of the meaning of language so as to change society. Terms like *chastity* that express traditional values are made suspicious and are discarded. Terms like *diversity* with positive connotations are given new content and then exploited. New terms like *polyamory* are invented for transmitting new ideologies. New terms like *homophobia* are introduced to smear opponents. The terms *values*, *freedom*, *tolerance*, *justice*, *equality*, *discrimination*, *diversity*, *marriage*, *family*, and *parent* have all experienced major redefinitions.

Another aspect of implementation has been the pornification of society. What was once forbidden by general society has now become completely normal. A headline from the *Huffington Post* on May 2013 states that “Porn sites get more visitors each month than Netflix, Amazon and Twitter combined”, with the article stating that “30 percent of all data transferred across the Internet is porn.”¹⁰ Kuby points out the well-documented fact that pornography is highly addictive, highlighting the lamentable fact that the addict

“... is caught in a vicious circle of a search for gratification through a means that provides the false appearance of gratification, only to throw him into even greater need and dependence. What he thinks he needs for his well-being destroys him and others. The drive develops a life of its own, becomes a tyrant,

and makes the person a slave to gratification of the drive” (p. 138).

Kuby addresses the role of the homosexual movement in great depth and contrasts that with a lucid explanation of the Christian perspective on homosexuality. This is ground that is likely more familiar to the reader, so while these topics compose more than 20% of the book, this review concentrates on other aspects.

The perversity of the threat

Perhaps the most distressing aspect of this threat is the sexualization of children. The material in chapter 12 will prompt a defensive response in most parents and is almost beyond belief. Kuby states that since mandatory sex education was introduced in German schools in the 1970s, it has been “a journey toward complete demoralization of sexuality”. Kuby explains that children “are incited to masturbate” (p. 215). This was so shocking that I requested a copy of the material. Kuby sent me a copy of *Lisa & Jan*, which has been used since 1996 and in one picture shows a small boy with a teddy bear masturbating.¹¹ Perhaps nothing exemplifies the shocking nature of the agenda to sexualize children from infancy more than Kuby’s statement that “in the accompanying booklet for parents, [Sielert, one of the authors] clearly states that children must be guided into it: ‘Naturally, children discover this pleasure on their own if they are positively caressed ahead of time by their parents. If they don’t know at all what lust is, there will be no sex play’” (FN332, p. 223). This is pedophilia and should be abhorrent to any parent. Kuby states that the core objective of this obligatory school sex education “was ‘sexual liberation’ through destruction of Christian values” (p. 217). As a parent, you might decide that you would rather home school than have your child subjected to material so damaging

to their innocence. But in Germany, home schooling is illegal.¹² There is no escaping the State's desire to subjugate your God-given authority as a parent to protect your children. Kuby asks:

“HOW IS IT POSSIBLE that a whole generation has fallen into the hands of a cultural revolutionary mafia that appears bent on turning future generations into amorphous, rootless masses of sex-addicted consumers?” (p. 228).

The author

Gabriele Kuby was born near the end of WW2 in Konstanz, Germany, in 1944, and is the mother of three children. Kuby appears to have impeccable credentials for her current role, with a degree in sociology after having grown up in an environment of intelligence and incisive intellect. One of her uncles was E.F. Schumacher, a noted German economist, and another uncle was Werner Heisenberg,¹³ winner of the Nobel Prize in 1932 “for the creation of quantum mechanics”.¹⁴

Courage is another essential attribute for Kuby's role and she had strong examples. After Hitler came to power, Heisenberg insisted on teaching about the roles of Jewish scientists and was attacked as a “White Jew” and investigated by the SS.¹⁵ Kuby's father, Eric (1910–2005), was a left-wing journalist and screenwriter who opposed the Nazis.¹³

Proudly following in her father's steps, Kuby became part of the left-wing student movement for a short time whilst studying at the Free University of Berlin. Kuby searched for truth all her life, and in 1973 started a search for God that lasted 20 years. Kuby investigated New Age, esotericism and psychology, with elements of Buddhism, Hinduism and American Indian spirituality. Eventually, in 1997, Kuby converted to Christianity as a Catholic.¹³

Catholics will be very comfortable with Kuby's devout Catholicism,

which is quite evident in several chapters of the book. Evangelicals may initially find Kuby's particular flavour of Christianity a little challenging. But, like myself, they will no doubt appreciate her love of Jesus, which is evident in the book and in her talks¹⁶ and may perhaps find in Kuby a reason to challenge the limits of their own perceptions.

Since her conversion in 1997, Kuby has published 12 books, focusing increasingly on the sexual revolution. She is an international speaker who has toured Australia, Taiwan, South Korea, USA and Columbia. *The Global Sexual Revolution: Destruction of freedom in the name of freedom* has so far been translated into 14 languages, with more in preparation.

Origins

Not surprisingly, given the issue of gender fluidity, Kuby notes Jesus' emphasis that “from the beginning the Creator ‘made them male and female’” (Matthew 19:4) (p. 191). But this is not just a convenient text for Kuby, who appears to present Adam as a historical person: “Adam's special position among all creatures is shown by his giving names to all animals” (p. 116).

Nonetheless, Kuby uses language that appears at first to be equivocal, speaking of the “first creation story” and stating that “It could be *true*” (p. 189). These are not words that I would choose to use, but in discussions with Kuby it became clear that her aim is to reach a wider audience with her message, including those who are evolutionists. Kuby's approach is at this point propositional rather than declarative, so as to encourage engagement. Whilst that was for me an initial stumbling point, I came to appreciate Kuby's approach. Her aim is to draw into the discussion those who do not hold to a biblical view of origins and present them with the truth, as she states it, that “God created mankind in his image; in the

image of God he created them; male and female he created them” (Genesis 1:27)” (p. 189). Kuby states that “On this belief rests all of Western culture, which became the model for the entire world” (p. 189). She posits that “It is unlikely that lies or delusions can give rise to such creative force as seen in the Western culture built on Christianity” (p. 189).

References

1. *The Lord of the Rings: The fellowship of the ring* [DVD], New Line Cinema, USA, 2001.
2. All references are to the first Australian edition, which is out of print and has recently been replaced by the second edition.
3. See documentation in Cosner, L., Abortion: an indispensable right or violence against women? creation.com/abortsex, 6 February 2007.
4. Butler, J., *Gender Trouble: Feminism and the subversion of identity*, Routledge, New York, 1999.
5. *Universal Declaration of Human Rights*, ohchr.org, accessed 11 June 2018.
6. *The Yogyakarta Principles*, data.unaids.org, accessed 11 June 2018.
7. *An Activist's Guide to The Yogyakarta Principles*, ypinaction.org, accessed 11 June 2018.
8. ‘LGBTI’ is an abbreviation for ‘lesbian, gay, bisexual, transsexual and intersexual’. The abbreviation is constantly changing as new variants are added, so ‘+’ is commonly added to reference other variants, such as questioning, queer, pansexual, two-spirit, androgynous, and asexual.
9. Belien, P., Former Soviet dissident warns for EU dictatorship, *The Brussels J.*, February 2006, brusselsjournal.com.
10. Porn sites get more visitors each month than Netflix, Amazon, and Twitter combined, *Huffington Post*, 5 May 2013, updated 12 July 2017.
11. Herrath, F. and Sielert, U., *Elterninformation, Lisa & Jan, Ein Aufklärungsbuch für Kinder und ihre Eltern*, Beltz Verlag, Weinheim, 1991.
12. Hauck, I., German parent flees, gives testimony, hslda.org, February 2016.
13. Eric Metaxas interviews Gabriele Kuby on her book, *The Global Sexual Revolution*, youtube.com, 3 April 2018.
14. The Nobel Prize in Physics 1932, nobelprize.org, accessed 27 April 2018.
15. physics.ucla.edu/~moszkowski/histnucl/np30/heisjp.htm, accessed 25 August 2018.
16. ACL National Conference EMBOLDEN—Gabriele Kuby, youtube.com, 12 December 2017.

Debating origins

Four Views on Creation, Evolution, and Intelligent Design

J.B. Stump (Ed.)

Zondervan, Grand Rapids, MI, 2017

Shaun Doyle

Four Views on Creation, Evolution, and Intelligent Design is not the first ‘Counterpoints’ book on the origins debate published by Zondervan. The previous attempt, *Three Views on Creation and Evolution*, was an abject failure.¹ A more recent volume, *Four Views on the Historical Adam*, was much better, but still beset with some weaknesses.² Plus, it only dealt with one aspect of the origins debate: Adam. Thus, there was plenty of reason for a new ‘Counterpoints’ volume on the origins debate. *Four Views on Creation, Evolution, and Intelligent Design* attempts to fill that need.

Unlike previous attempts, *all* the essay contributors are among the best-known and most experienced expositors of their views. The young-earth creation view is represented by Ken Ham, president of Answers in Genesis–US. Old-earth (progressive) creation is represented by Hugh Ross, president of Reasons to Believe. ‘Evolutionary creation’ (more widely known as ‘theistic evolution’) is represented by Deborah Haarsma, president of BioLogos. And Intelligent Design is represented by Stephen Meyer, Senior Fellow at the Discovery Institute, who directs their Center for Science and Culture in Seattle. The format follows that of *Four Views on the Historical Adam*, with an essay from each contributor, responses to the essay from the others, and a short rejoinder from the essay author.

However, the editor, J.B. Stump, is a senior editor at BioLogos.³ This does

not look so good, since it immediately raises questions about the editor’s partiality, which unfortunately surfaces in his conclusion.

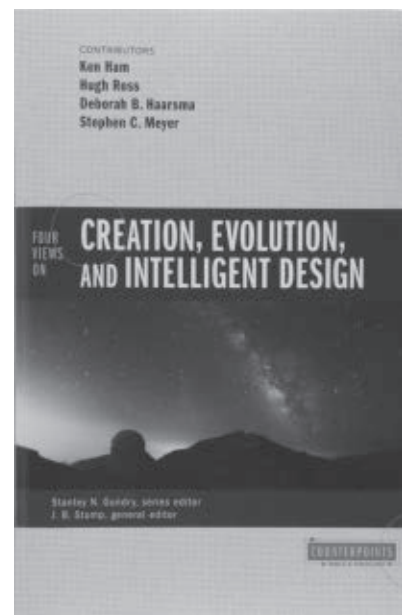
Ken Ham: Young-earth creation

Ham’s contribution is the clearest and strongest defence of biblical creation to date in any ‘multi-views’ book like this.

Perhaps the strongest aspect of Ham’s essay is his presentation of the biblical issues. Ham ably defends the ‘historical week’ view of Genesis 1 against attempts to compatibilize it with deep time. He shows how only the young-earth view coheres with the redemptive historical narrative of Scripture: cosmic creation, cosmic fall, and cosmic restoration in Christ. He also defends well a global Noahic Flood, showing how it’s a fulcrum for interpreting the physical evidence in relation to the history of nature.

One thing that marks Ham out from the other contributors is his (correct) insistence that the young-earth view is the only one properly submitted to Scripture’s authority:

“The difference between young-earth creationists and all our Christian and non-Christian opponents is that we accept God’s eyewitness testimony in Scripture and use it to interpret the physical evidence that we see in the present. Our opponents either reject the Word of God or ignore many of the details of the Word and use the secular world’s naturalistic assumptions and interpretations of physical evidence to reinterpret God’s Word to make it fit with some parts, or all, of the evolutionary story about the past. Thus, I contend, regardless of any sincere intentions to the contrary, they are undermining the authority of the Word of God” (p. 34).



On the physical evidence, Ham points out that it’s not the physical evidence itself that conflicts with the Bible, but uniformitarian/evolutionary *interpretations* of the physical evidence. He then fleshes out the deistic/skeptical origins of deep time thinking in the 18th–19th centuries, focusing mainly on James Hutton and Charles Lyell. He then briefly touches on some basic reasons why a biblically based interpretation of the rocks, fossils, and living organisms works. And he concedes that we don’t have all the answers, one area of ongoing research being the ‘distant starlight’ issue. But whatever the questions we face, we explore them “within the interpretative framework of the eyewitness testimony of the Creator” (p. 43).

Finally, he spells out his view of the significance of this origins debate. He affirms that one can be a Christian and believe in evolution and/or deep time. Nonetheless, the Gospel is at stake, because the Bible’s ‘cosmic creation/cosmic fall/cosmic redemption’ history isn’t compatible with deep time. Specifically, death is an enemy (1 Corinthians 15:26); Adam’s spiritual and physical death was the result of his sin. It also brought sin and death to us all, and ‘bondage to decay’ to the

entire creation.⁴ Take this historical redemptive schema away, and Jesus' death loses all meaning as a sacrifice for sins.

There is little to disagree with in Ham's presentation. He sums up the issues well, explains and defends the young-earth position ably, and gives a fair statement of the significance of the issue.

Discussion

Of all the discussions, this is the most focused on the Bible. Discussion centres around Ham's accusation that long-age views *automatically* undermine biblical authority. All the other contributors decry this, but in different ways. Ross says his model better integrates Scripture and science than Ham's. Haarsma insists on her 'accommodation' theory (see below) and accuses Ham of ignoring the authority of creation's witness. Meyer is perhaps most conciliatory, saying that young earthers could support ID, but also that he finds the day-age interpretation suggested in Days 1–3 of Genesis 1. All say that Ham is conflating his interpretation of Scripture with Scripture.

Unsurprisingly, Ham isn't swayed. He correctly points out that the young-earth view was unanimously held before deep time swayed opinions in the church, intrinsic to the scriptural narrative of redemption, and sufficiently clear that we're culpable of undermining Scripture if we ignore or reject it. Ham closes by echoing Luther 500 years earlier: our conscience is captive to the Word of God.

Hugh Ross: Progressive creation

Ross has a fascinating way of looking at deep time history. He views it in overtly teleological terms. He thinks the whole history was designed for the rise of man and the history of redemption, right down to nutrient cycling and the sequestration of different mineral species in appropriate amounts. It's quite creative, and perhaps the most overtly Christocentric view of deep time history around.

Much of his essay expounds on this. It's almost a pity his 'model' contradicts Scripture so blatantly.

The arguments against Ross's views have been treated extensively elsewhere,⁵ so I will only touch on a few salient points in his essay.

The Bible: obviously old earth?

Ross believes "biblical evidence for a creation history much longer than ten thousand years supports, *and I believe should compel*, the old-earth interpretation [emphasis added]" (p. 79). Absurd. The whole origins debate is predicated on the Bible at least *seeming* to conflict with deep time. If it didn't seem to at some level, there would be little debate.

Ross even finds his deep time 'creation model' *confirmed* at numerous places in the Bible. Most of his arguments focus on passages that describe the earth and features as 'old' and 'ancient', failing to realize that these are relative terms. In reality, ~6,000 years is extremely ancient; only the indoctrination into billions of years can make someone think that this is 'young'.

Most old-earthers understand the Bible doesn't teach deep time, much less prefigure accurately specific aspects of the modern understanding of deep time history. But Ross reads his model into the Bible so much that it would seem God was waiting for Ross's model! He takes confirmation bias to a whole new level.

Multiple creation accounts?

Ross regards passages with diverse genres and purposes all as 'creation accounts' (p. 79), e.g. an actual prose narrative cosmogonic account (Genesis 1), a poetic celebration of the created order (Psalm 104), a poetic celebration of wisdom (Proverbs 8), and a polemical broadside using the created order (Job 38). Genesis 1 is certainly a 'creation account', but these other passages? Of course not! They all contribute to a biblical theology of creation, but not to a chronology of God's creative acts.

In response, Ross charges: "Young-earth creationist leaders disagree with the day-age view that all the Bible's books are equally authoritative with reference to creation and nature's realm" (p. 98). Again, absurd. The issue is not the relative *authority* of these texts to the biblical doctrine of creation; the issue is their relative *relevance* to reconstructing the biblical framework of the history of nature. Job 38, Psalm 104, and Proverbs 8 don't *aim* to give a chronology of God's creative acts as Genesis 1 does.

Neandertal no man?

Ross's 'date ranges' for Adam keep getting bigger; it's now at "12,000–135,000 years ago" (p. 92). He keeps insisting that all 'species' in the *Homo* genus other than *H. sapiens sapiens* are not true 'image of God' humans (p. 89), despite overwhelming evidence to the contrary.⁶ Even old-earthers such as C. John Collins have backed away from Ross's anthropology.⁷

Species fixity?

Ross advocates for something akin to species fixity:

"The Bible's use of the Hebrew word *min*, for 'kind,' suggests that for the higher animals (Lev 11:13–18; Deut 14:12–18), natural-process evolution is limited to the species level, and for lower animals (Lev 11:22) to the genus level" (p. 90).

However, the Bible doesn't delineate clear boundaries between baramins.⁸

He also decries young-earth 'rapid evolution' ideas concerning post-Flood diversification (p. 100). Some examples in the creationist literature are open to Ross's critique,⁹ but not the properly informed ones that Ross ignores.¹⁰ Still, Ross thinks far too gradualistically about diversification. The greatest diversification likely happened immediately post-Flood, and generally decreased through time.¹¹

Moreover, how much post-Flood diversification we infer happened depends crucially on how high the Flood/post-Flood boundary is in the rock record. The higher it is, the

less diversification needed. While it is a live controversy, I favour a high boundary in the uppermost Cenozoic.¹²

Ross has some rather creative ideas. But, his brand of progressive creation often blatantly conflicts with the clearest exegetical and empirical evidence in the origins debate.

Discussion

This discussion has shown off most clearly the different perspectives and emphases of the views. The hermeneutical differences between Ham, Ross, and Haarsma are quite clear, and the unique focus of Meyer and ID is also quite clear.

Ross spends most of his rejoinder dealing with Haarsma and Ham, since there isn't much from Meyer for him to disagree with (who, considering his broad agreement with Ross, used his response to argue against universal common ancestry). Ham is on point most of the time, as a telling admission from Ross shows: "I agree that Job 37–39, Psalm 104, and Proverbs 8 are not creation chronologies in the way Genesis is" (p. 122). The Haarsma–Ross exchange is rather weird—both are wrong, but often in different ways. Essentially, Ross can't read the Bible, and Haarsma can't believe it.

Deborah Haarsma: Evolutionary creation

"Evolution is real. The Bible is true." (p. 124). Most people in America think Haarsma stated a contradiction. She sees *that* as the problem. Her solution? "Evolutionary creation" (EC):

"Evolutionary creation is the view that God created the universe, earth, and life over billions of years, and that the gradual process of evolution was crafted and governed by God to create the diversity of all life on earth" (p. 125).

Accommodating the Bible to evolution

Haarsma claims to endorse contextual exegesis. Her main exegetical conclusion? Genesis 1 assumes a 'flat earth, solid sky' physical cosmology

(figure 1). But her point isn't exegetical; it's about hermeneutical method. She's saying that God didn't correct their "pre-scientific" (i.e. false) cosmology (pp. 130–132).

Haarsma effectively *agrees* that the Bible conflicts with 'modern science'. But she doesn't think that undermines the Bible's authority. She thinks the Bible contains *incidental* references to scientific falsehoods, but since it never *aims to teach* them as truth, the Bible is still true in all it *aims to teach*. Her science doesn't dictate her favoured biblical interpretation, but it does dictate what, in Scripture, she can believe.¹³

Baptizing evolution

Next, Haarsma turns her attention to 'reading the book of nature'. Christianity was science's handmaiden, but should our science look different from atheists'?

"Well, we don't expect our science to look differently, since Christians and atheists are studying the same created world with the same divinely given mind" (p. 133).

We expect our *operational* scientific picture to be empirically equivalent with atheists, but not our understanding of the *history of nature*. God upholds nature *and* acts within it. He does miracles. Atheists must

view history through a naturalistic lens. Biologos uses the same lens in prehistory. They just baptize it as 'providence'.

Haarsma briefly summarizes the standard 'evidences' for deep time. But they're less 'evidence' and more 'naturalistic interpretation'.

Haarsma focuses more on evidence for evolution. She describes the process of natural selection. But can that (and other non-intelligent processes) explain *all* life's diversity? She doesn't say. Instead, she provides evidence for a *pattern* of common ancestry. But life's diversity *looking* like a family tree doesn't mean the only plausible way to explain the pattern is apart from intelligent input.

Finally, she turns to human evolution. She gives chromosome 2 fusion as evidence for our relatedness to chimps. She also says population genetics shows "the scientific evidence does not rule out the historicity of Adam and Eve; it only rules them out as sole progenitors" (p. 147).

Creationists have done much work recently to answer such charges.^{14,15} But Haarsma said earlier: "Science should not dictate the best biblical interpretation" (p. 127). Yet, the best interpretation of e.g. Acts 17:26 and 1 Corinthians 15:45 could be that Adam was the sole progenitor of all

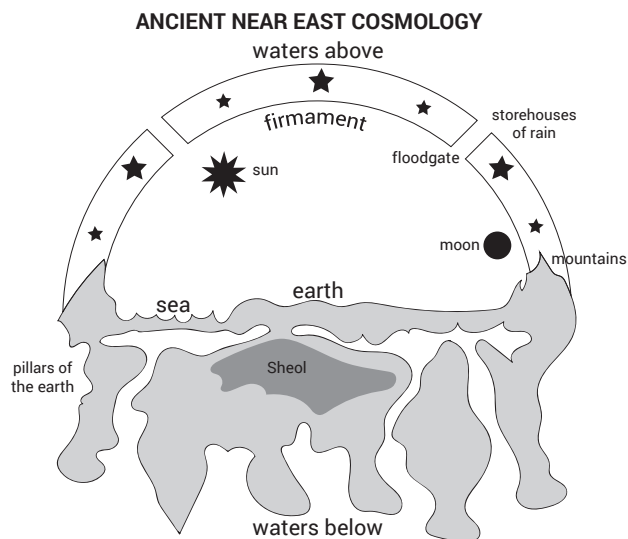


Figure 1. Haarsma's depiction of the 'flat earth, solid sky' cosmology supposedly common to the ancient world (after Haarsma, p. 129).

humanity.¹⁶ She must *rule out* that interpretation because of her *scientific* commitments.

So, what challenges does Haarsma see for her view? She canvasses several, the most important being Original Sin and death before the Fall. She commits standard errors. On Original Sin, she says the fact that we're all sinners matters more than why it's so, conveniently ignoring that the Bible teaches both *that* we're sinners and *why* we're sinners. On death before the Fall, she suggests a 'spiritual death only' view of the Fall. This founders on Genesis 3:19, as well as Paul's clear connection of Adam's death with Jesus' *physical* death and *physical* resurrection in 1 Corinthians 15.

So, is 'evolutionary creation' 'a reasonable option for serious Christians and serious scientists'? No. It's a mollifying muddle that makes a mess of both the Bible and evolution.

Discussion

EC fares badly under cross-examination. The responses all have strengths. Ham is best on the biblical problems of EC. Meyer is best on the empirical problems with EC. Ross makes some good points about how evolution undermines general revelation. Both Ham and Ross explore the weaknesses of Haarsma's accommodation theory.

Haarsma's rejoinder is weak. Most of her rejoinder is focused on Meyer's criticisms. But she essentially confirms Meyer's point that EC is "vague and ambiguous" about God's causal relation to the world. She ignores most of the objections to her 'accommodation' theory that Ham and Ross raise. Instead, she simply restates her view in response to Meyer (p. 174), who doesn't raise the issue.

Stephen Meyer: Intelligent Design

The Intelligent Design movement (IDM) is an anomalous inclusion. The other organizations aim to integrate Scripture and the history of nature (in

very different ways). IDM doesn't. It's not even explicitly theistic. It concerns itself only with physical evidence, and then only regarding the detection of design. Meyer outlines:

The theory does not challenge the idea of evolution defined as either change over time or common ancestry, but it does dispute the Darwinian idea that the cause of biological change is wholly blind and undirected. ... Design theorists ... argue that living organisms look designed because they really were designed" (p. 180).

Design through history

Meyer traces the history of the design argument from Thomas Aquinas to William Paley. It was eclipsed in the aftermath of Darwin's *On the Origin of Species*. But, since the 1950s and the discovery of DNA's structure, the design argument has been reinvigorated. Advances have revealed the amazing complexity and specificity of biological structures and functions, especially DNA. So, where did this information come from?

Meyer summarizes his arguments for design from his books *Signature in the Cell*¹⁷ and *Darwin's Doubt*.¹⁸ Regarding new functional information arising within organisms, random mutation and natural selection can't 'find' enough functionally complexifying solutions over evolutionary time to produce one functional protein, let alone whole organisms. With the origin of life, it's even worse. DNA information isn't a given, like it is with subsequent evolution, but rather itself is what needs explaining.

Design: the best explanation?

How do we reason to design? Meyer says that, typical of historical scientific argumentation, ID is an *inference to the best explanation*. Basically, some surprising fact B is observed: if A were true, B would follow as a matter of course; therefore, we have reason to suspect A is true.

But B could be true for a reason other than A. We need to do something else—compare different potential



Figure 2. Why is the grass wet? To figure it out, we engage in the same reasoning commonly used in the historical sciences: inference to the best explanation.

explanations of the evidence. Consider the question: why is the grass wet (figure 2)? It's sunny, there are some suds on the ground, and there are muddy tire marks in the grass. We would suspect a car was washed on the grass. The additive effect of the observations renders one of several options the *best* explanation.

But it could be wrong. If we found other evidence, e.g. a car parked there during a storm the previous night, and the suds were only around a tap where people had recently washed their hands with soap, we'd conclude rain caused the wet grass. Arguments to the best explanation are always tentative and provisional.

So, why does Meyer say design is the best explanation? First, it's causally adequate. Design produces information. Second, naturalism is not causally adequate. No causally adequate natural explanation for the origin of life or the diverse functional structures within life is known. Third, design and evolution are the only options available. Thus, design is the best explanation.

Challenges to ID

Finally, Meyer addresses a few common objections to ID. First, is ID an argument from ignorance? No, he answers. ID depends *in part* on negative assessments of proposed naturalistic mechanisms. But it also appeals to what we know: "we *know* that intelligent agents can and do produce specified information-rich systems" (p. 204). Second, is ID science? Irrelevant, he says: "Surely, simply classifying an argument as 'not scientific' does not refute it" (p. 206).

Meyer expounds the ID position well. There's little to disagree with in his biological design argument. But the lack of scriptural, or even theistic, focus in IDM leaves the most important things about life's origin unsaid.

Discussion

This discussion focuses more on IDM's strategy than its truth. Only Haarsma broadly rejects Meyer's conclusions. She espouses methodological naturalism, and raises the 'god of the gaps' spectre.¹⁹ Ham and Ross take little issue with Meyer's arguments for ID. But all three complain that ID doesn't address the science-Bible dialogue. They also point out that it's not evangelistically oriented. Meyer replied that ID is purposefully limited in scope.

As the others allege, ID's scope is too limited. Plus, ID strategy seems doomed to fail. It failed apart from Scripture against Darwin, and now mainstream biology stakes its legitimacy on having defeated design in Darwin. ID by itself can't successfully critique such a legacy; only the Bible can.

J.B. Stump (editor): introduction and conclusion

Stump was a poor choice for editor of this volume. He is an editor for BioLogos, so that one of the contributors (Haarsma) is his superior, creating a clear conflict of interest. He acknowledges this, and says he tried to make the editorial process as impartial as possible:

"... in my day job, one of the contributors is my boss! I worked very hard to allay those concerns" (p. 232).

Did it work? In part, yes: the essays and responses are a fair representation of the current state of the origins debate. This is what the book aims to do, and it achieves its aim well.

Moreover, Stump's introduction gives a workable overview of the different positions on offer in the book. His categorization of the views, though, reveals his preference for

scientific consensus, since he defines each view by how much of the mainstream 'scientific' consensus they accept (p. 13).

But, in another sense, no. Stump singles out Ham for censure in his conclusion:

"The most obvious discrepancy that remains is in the initial essays, where Ham's is noticeably longer than the others. He was unwilling to cut anything further, believing it only fair that he should be given more space than the others since he was the only one defending the young age of the earth and 'the authority of Scripture vs. the authority of the scientific majority.' Of course each of the other contributors could come up with reasons why they should be entitled to extra space too. But my rationale did not persuade, and I was committed to giving contributors the final control of their words. Readers can judge for themselves what effect this has on the book" (pp. 232–233).

Is Ham's essay several pages longer than anyone else's? No. Meyer's essay (pp. 177–208) spans the same number of pages as Ham's essay (pp. 17–48), and Ham and Meyer both lack figures in their essays. So, 'noticeably longer' *for the reader* is rather dubious, to say the least.

Was Ham unreasonable? Without Ham's side of the story, it's foolish to judge (Proverbs 18:17). Still, editors have to deal with 'unreasonable' authors all the time; it goes with the job. But editors also have a duty of care to be as impartial as possible. Stump's reputation for impartiality was already suspect. He knew this. But he destroyed his credibility by needlessly exposing the difficulties of the editorial process with the one author he disagrees with the most.

Stump's contributions paint theistic evolutionists as 'reasonable' and young-earthers as 'arrogant' and 'intransigent'. If Ham's words alone had done that, so much the worse for Ham and young-earthers. But when the editor needlessly gives that impression,

it prejudices the audience against one of the contributors, and thus the view of that contributor.

Conclusions

This book has strengths. Considering the essays and responses from the contributors alone, it provides a fair representation of the state of the origins debate. This, refreshingly, included the young-earth view, since an experienced expositor of the view wrote the essay, unlike previous 'multi-views' volumes. If someone is looking for a summary of the main positions in the origins debate and a basic idea of how they might interact with each other, this volume does a good job. However, the editor's conclusion is clearly prejudicial against biblical creation, and serves to undermine, rather than foster, the unity he claims he wants to see.

References

1. Kulikovskiy, A., A balanced treatment? A review of *Three Views on Creation and Evolution*, Moreland J.P. and Reynolds, J.M. (Eds.), *J. Creation* 14(1):23–27, 2000.
2. Doyle, S., Debating the historical Adam and Eve: A review of *Four Views on the Historical Adam*, Barrett, M. and Caneday, A. (Eds.), *J. Creation* 28(2):35–40, 2014.
3. See for example Price, P., Stumped by biblical creation: *BioLogos* takes a cheap shot at biblical creation ... and misses, creation.com/stump, 24 November 2015.
4. Smith, H., Cosmic and universal death from Adam's Fall: an exegesis of Romans 8:19–23a, *J. Creation* 21(1):75–85, 2007; creation.com/romans8.
5. Sarfati, J., *Refuting Compromise: A biblical and scientific refutation of "progressive creationism" (billions of years), as popularized by astronomer Hugh Ross*, 2nd edn, Creation Book Publishers, Atlanta, GA, 2011. Ken Ham himself said about this: "Well, I believe, personally, that your book, *Refuting Compromise*, is a classic on the same scale as *The Genesis Flood*. ... I personally believe it'll go down in history as a turning point in the creationist ministry worldwide. I see it as that important. I see it as that definitive. ... I really see it as a modern creationist classic. And I really believe that every single person needs a copy of this book to show the positive aspects, that we can defend, logically, the book of Genesis, and that God's word is authoritative right from the very beginning, and we can confront compromise, like Progressive Creationism ..." (*AnswersLIVE*, Refuting Compromise, live broadcast 27 April 2004).
6. Line, P., Progressive creationist anthropology: many reasons NOT to believe: A review of *Who was Adam?* by Rana, F. with Ross, H., *J. Creation* 20(3):31–38, 2006.

7. Biblical creationist Wood, T.C., Who were Adam and Eve? Scientific reflections on Collins' *Did Adam and Eve Really Exist?* *JCTS Series B* 2:28–32, 2012 presses Collins on the scientific and theological problems with his prior favourable mention of Ross's 'RTB human origins model'. Collins, C.J., Replies to Reviews of *Did Adam and Eve Really Exist?* *JCTS Series B* 2:43–47, 2012 is much more circumspect: "Dr Wood observes, 'Or perhaps, considering his otherwise humble approach to the scientific evidence, Collins would not have a definite opinion about Neandertals.' Well, he can be the judge of whether I am truly humble, but this is indeed where I land."
8. Lightner, J.K., Hebrew Scriptures as an aid to developing a creationist taxonomy, *J. Creation* 24(1):77–81, 2010.
9. For instance, Wise, K.P., Mammal Kinds: How many were on the Ark?; in: Wood, T.C. and Garner, P.A. (Eds.), *Genesis Kinds: Creationism and the Origin of Species*, Wipf and Stock, Eugene, OR, p. 143, 2009. Wise speculates that cetaceans may have been derived from fully terrestrial pre-Flood ancestors.
10. Sarfati, J., Trilobites on the Ark? Hugh Ross's latest bumbles on the created kinds, *creation.com/trilobites*, 30 July 2004.
11. Wood, T., Mitochondrial DNA analysis of three terrestrial mammal baramins (Equidae, Felidae, and Canidae) implies an accelerated mutation rate near the time of the Flood; in: Horstemeyer, M. (Ed.), *Proceedings of the Seventh International Conference on Creationism*, Creation Science Fellowship, Pittsburgh, PA, 2013.
12. Clarey, T.L., Local Catastrophes or Receding Floodwater? Global Geologic Data that Refute a K-Pg (K-T) Flood/post-Flood Boundary, *CRSQ* 54(2):100–120, 2017.
13. For more in-depth refutations, see Holding, J.P., Is the *raqia* ('firmament') a solid dome? *J. Creation* 13(2):44–51, 1999; Holding, J.P., Is the 'erets (earth) flat? *J. Creation* 14(3):51–54, 2000; and Doyle, S., Ancient cosmology and the timescale of Genesis 1, *J. Creation* 32(3):115–118, 2018.
14. Sanford, J. *et al.*, Adam and Eve, designed diversity, and allele frequencies; in: *Proceedings of the Eighth International Conference on Creationism*, Whitmore, J.H. (Ed.) Creation Science Fellowship, Pittsburgh, PA, pp. 200–216, 2018.
15. Jeanson, N. and Tomkins, J., Genetics confirms the recent supernatural creation of Adam and Eve; in: Mortenson, T. (Ed.), *Searching for Adam*, Master Books, Green Forest, AR, pp. 307–312, 2017.
16. Sibley, A., Adam as the protoplast—views from the early church in response to the archetypal view, *J. Creation* 28(3):86–91, 2014.
17. Meyer, S.C., *Signature in the Cell*, HarperCollins, New York, 2009.
18. Meyer, S.C., *Darwin's Doubt*, HarperOne, New York, 2013.
19. Weinberger, L., Whose god? The theological response to the god-of-the-gaps, *J. Creation* 22(1):120–127, 2008.

The war on truth

The War on Science: Who's waging it, why it matters, what we can do about it

Shawn Otto

Milkweed Editions, Minneapolis, MN, 2016

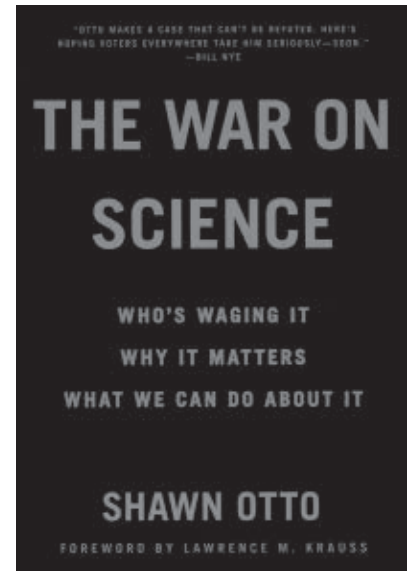
Andrew Kulikovsky

Shawn Otto is a science writer, novelist, film-maker and 'Green' activist. He believes there is an orchestrated war on science: "A vast war on science is underway, and the winners will chart the future of power, democracy, and freedom itself. This book is an account of that war, and what we—concerned citizens of all political persuasions, in all countries—can do to win it" (p. 10).

The book has a foreword by atheistic cosmogonist Lawrence Krauss, and a front-cover blurb by Bill Nye, who once acted as 'the Science Guy' on children's TV.

According to Otto, the war on science is coming from both the political left and right, but he believes the right—a coalition of fundamentalist churches and corporations largely in the resource extraction, petrochemical, and agrochemical industries—is largely anti-science and has far more dangerous public policy implications because good policy is being inhibited by a desire to protect destructive business models.

Otto asserts we have an unsupportable population that is destroying our environment, and the developing world is adopting the same unsustainable development model. However, he claims: "Political and religious institutions are pushing back against science and reason in a way that is



threatening social and economic stability" (p. 7).

Manufactured controversy?

The author claims that 'establishing a controversy' is the most common aspect of modern anti-science attacks "because it takes advantage of the reasonable sounding but incorrect idea that a 'healthy debate' reveals the truth. When such a debate pits knowledge against a passionately articulated opinion, the opinion often wins" (p. 19). Otto questions whether there really are two sides to every story, and suggests alleged controversy is an invention of journalists trying to find an angle in order to get a headline. For Otto and other scientific rationalists, one of these conflicting claims can be shown to be objectively false, and it is irresponsible reporting to present a controversy when none exists. But denying or refusing to account for inconvenient facts does not make them disappear and scientific issues are all too often decided by a 'preponderance of opinion' rather than evidence.

In Otto's mind, science is based on "... accumulated knowledge gained from tens of thousands of painstaking experiments done by thousands of scientists working over fifty years taking and reporting on billions of measurements reproducible by others, as in the case of climate science, and the other side is a persuasive opinion articulated by a passionate advocate who is intent on convincing viewers of the rightness of his or her perspective, by presenting them as a debate ... presenting them to the public as if they had equal merit with tested knowledge" (p. 23).

The author basically wants journalists to only report the current scientific consensus, but science is not a democratic process. Many measurements and observations are not repeatable because they were done in the past—this is especially the case in 'climate science'. And much analysis cannot be reproduced because many climate scientists refuse to release their data and source code used to normalize and analyze their data.

Otto argues that allowing the teaching of alternative theories on politically contentious topics like evolution, climate change, or birth control in science classes is damaging children's ability to learn critical thinking. However, the very opposite is the truth. Being taught only one view is to be taught what to think, rather than how to think. If the evidence is so one-sided as the author claims then why not present all the arguments and evidence for both sides? This is the only way to effectively develop critical thinking skills. However, for scientific materialists like Otto, nothing must ever be allowed to call into question the current scientific dogma.

Otto asserts that there is "no scientific controversy about the theory of evolution" (p. 27), but this is because evolution is not science! If we allow different views in relation to evolution, students would

be introduced to Jonathan Wells' *Icons of Evolution* which exposes the vacuousness of the evidence supporting it.¹

If we allow different views in relation to the effectiveness of sex education, students would be told about recent peer-reviewed studies of sexual and reproductive health educational programs that found no evidence of improved health outcomes. In one study the authors concluded—after examining the actual biological outcomes rather than mere self-reporting—that "the educational programs evaluated had no demonstrable effect on the prevalence of HIV ... or other STIs [Sexually Transmitted Infections] ... There was also no apparent effect on the number of young women who were pregnant at the end of the trial."² Other studies have made similar conclusions.³

For Otto, teaching the controversy regarding evolution suggests there is a legitimate scientific controversy when, in Otto's opinion: "There simply isn't. Evolution is the most well supported knowledge in science" (p. 216). But this claim is laughable. As Jonathan Wells has shown, the iconic evidence for evolution is a mirage.¹

What is science?

According to Otto, the very essence of the scientific process is to question long-held assumptions about the nature of the universe, to design experiments to test those assumptions, and to acquire knowledge that is independent of our beliefs, assumptions, and identities, based on our observations. This knowledge is asserted to be independently verifiable and objective. Otto argues that scientifically testable claims are transparent and can be shown to be either most probably true, or false, regardless of who made the claim. "Because it takes nothing on faith, science is inherently

antiauthoritarian, and a great equalizer of political power" (p. 45).

Otto believes science is conservative because "it is retentive of knowledge and cautious about making new assertions until they are fully defensible" but also progressive because it is "open to wherever observation leads, independent of belief and ideology, and focused on creating new knowledge" (p. 84). This conception of science and scientists is completely divorced from reality and is, at best, breathtakingly naive. At worst, it is utterly delusional, as will be shown below.

The author describes the scientific method as a collection of techniques—including observation, inductive reasoning, hypothesizing, prediction, experimentation, recording, critical peer review, and replication—used to objectively measure things in the real world in order to acquire reliable knowledge independent of our perspectives. He explains that 'objective' means "stripped of personal, religious, political, emotional, cultural, sexual, referential, and other biases, which is what the process of science works to achieve via repeated testing, confirmation, and peer review" (p. 163).

Furthermore, scientists are concerned with evidence, falsifiability (vulnerability to disproof), and defensible statements. Again, Otto holds the naive view that scientists seek "to draw and defend conclusions supported by observational evidence but testable by anyone ... scientists speak in terms of the preponderance of the evidence, and in terms of disproof" (p. 179). As Karl Popper wrote: "the criterion of the scientific status of a theory is its falsifiability, or refutability, or testability ... A theory which is not refutable by any conceivable event is non-scientific. Irrefutability is not a virtue of a theory (as people often think) but a vice" (pp. 234, 235). So for Otto, if there is no

possible way to prove a hypothesis is false then it is not science and it cannot produce any real knowledge. However, he seems completely blind to his own assumptions about ‘scientific truth’. What scientific test would invalidate evolution? What scientific test would invalidate radiometric dating? What scientific test would invalidate catastrophic anthropogenic global warming? By Otto’s own standard, none of these things that he considers to be absolute, settled, scientific fact are actually scientific!

Otto claims geological measurements show consistently that the earth is about 4.54 billion years old based on the uranium-lead and potassium-argon radiometric dating methods and what he describes as “simple math”. But Otto’s claim is false. Results of radiometric dating are not always consistent, and the methods suffer from several methodological problems. The initial amount of parent and daughter isotopes cannot be measured and must be assumed. Nor can the presence and magnitude of any contamination be measured. In addition, there is no way of knowing whether the decay rate has always been constant. These problems can all greatly inflate the ages derived from these methods. Indeed, many, many anomalous dates have been calculated. Although scientists routinely explain away these anomalies, the explanations are always *ad hoc*. As John Woodmorappe has pointed out, scientists credit dating methods for assumed successes, but blame nature for obvious failures. They also appeal to marginalisation and technicalities to reject inconsistent or ‘inconvenient’ dates.⁴

Otto ignores the Christian epistemological critique of science, where science is by definition only concerned with the material world. By definition, science leaves no room for the operation of the supernatural and the acquisition of knowledge by divine revelation. As a materialist, he



Figure 1. Michael Polanyi’s books *Science, Faith and Society*, and *Personal Knowledge* expose the myth of objective, empirical science: all knowledge claims rely on personal judgements.

is committed to logical positivism and argues as if Michael Polanyi (figure 1) never existed. Polanyi argued that positivism is inadequate because it assumes the ‘knower’ knew without actually being there—it does not take into account the knower’s ideas or presuppositions. Positivism assumes that the knower approaches everything without any presuppositions or assumptions, without any grid through which he feeds his data. But this is simply not true. All scientists feed their data through a grid that filters what they see and find. There are no totally objective observers and science cannot exist without observers. Therefore, Otto has no basis for knowing within his own philosophic system. In other words, he accepts science with no epistemological base. He is operating on faith rather than facts.

Unsurprisingly, the author places great faith in peer review. He naively believes that if peer reviewers discover any holes in the methodology, it gets sent back to rework, but if they conclude that it is solid and transparent enough to state their reputations on, it is recommended for publication. But as I have shown elsewhere, this is not even remotely close to

how the process works.⁵ Indeed, in a subsequent chapter, Otto points to Wakefield’s 1998 publication in *The Lancet*, a scientific paper that linked measles, mumps, and rubella vaccines to autism. Wakefield became a media star but it was later discovered that he had doctored his evidence to fit his *a priori* conclusion. The paper has since been discredited as fraudulent and withdrawn by the journal. But this raises the question of the quality and objectivity of the peer review process which the author had previously lauded as ensuring the highest quality of scientific research.

History of science

Otto attempts to inflate the contribution of Islam to science and asserts that Islam was the keeper of scientific knowledge during Europe’s ‘Dark Ages’. He refers to Ibn al-Haytham (AD 965–1040) and his work *Optics* as developing an early concept of the scientific method, and Musa al-Khwarizmi and the House of Wisdom in Baghdad as developing their own science in a range of fields. Regarding al-Haytham, as a youth, he explained in his autobiography that he thought the conflicting religious views of the various religious movements lead to the conclusion that none of them represented the truth. He became increasingly unhappy with his detailed studies of religion and made a decision to devote himself entirely to a study of science which he found most clearly described in the writings of Aristotle. Regarding the House of Wisdom, its main project was collecting and translating classical Greek literature and many works were borrowed from libraries in the West. Moreover, it attracted scholars and scientists, including Christians, from all over Europe and the Middle East to take part in their work.⁶

In any case, the popular negative perception of the ‘Dark Ages’ is

mythical. Respectable encyclopedias such as the *Columbia Encyclopedia* and *Britannica* reject the term. During the so-called Dark Ages, Europe made great technological and intellectual leaps in agriculture, engineering, and manufacturing.⁷

Unsurprisingly, Otto uses the Roman Catholic Church's treatment of Galileo in 1633 to claim that the church denied the validity of astronomical science by indicting Galileo "for the heresy for [*sic*] simply describing what he found by observing nature" (p. 61). One obvious difference is that Galileo's observations were in the *present*, while evolution is a claim about the *past* and climate change concerns the *future*. For Otto, Galileo's observations were categorical proof and "obvious to anyone who wanted to look through Galileo's telescope" (p. 44). However, as Schirmacher has pointed out, the idea of Galileo as a heroic scientist standing up to the narrow-minded dogmatism of the Catholic Church is a complete myth.⁸ Suffice to say that Galileo was in conflict with Aristotelian scientists not the church, and Galileo's observations did not prove heliocentrism. The scientific evidence *available to him and his contemporaries* was equivocal.^{9,10} The final proof (stellar parallax) was not found until 1838.

Otto objects to Thomas Kuhn's argument that science was not a gradual and painstaking accumulation of knowledge, but advances through sudden paradigm shifts. The author believes Kuhn cast science as an expression of politics and power because he documents how proponents of the prevailing paradigm continue to support it despite contrary evidence and new discoveries. According to Otto, Kuhn's error was to intertwine the politics of science and the discovery of truth, but the two are intertwined. Scientists are human beings with egos and reputations. Their careers are dependent on

publication and acceptance of their work. Standing against the prevailing paradigm is a first-class ticket to killing one's career. Yet Otto naively believes that if a new discovery better explains things, "the scientific community is all over it" (p. 182). This is a misreading of Kuhn. The scientific community will only reject the prevailing paradigm if contradictory evidence is overwhelming, and a new and better ideologically acceptable paradigm is ready to replace it. Contra Otto, Kuhn was not suggesting there was no objective truth, only an endless regression of subjective ideas. Kuhn was merely describing the path to discovery of objective truth as revolutionary rather than incremental.

Opinion vs science

According to the author, from the late 1990s onwards, non-scientists are increasingly unable to discern between knowledge and opinion. He complains about the Federal Communications Commission in the US abolishing the fairness doctrine where television and radio programmes must present controversial issues of public importance in an honest equitable and balanced manner. Those in favour of the repeal argue that market forces will result in competition in the marketplace of ideas which will stimulate broad-ranging and high-quality discussion. But in Otto's opinion, the opposite has occurred with discussion becoming less diverse and more polarized, and he points to the complete rejection by many people of climate science as a manufactured political project of socialists bent on a global takeover and government-funded scientists who enable them.

Otto rejects the notion of a 'marketplace of ideas' and that media organizations with a variety of viewpoints will compete to deliver the highest quality journalism at the best price. For Otto, journalism's function

in a democracy is to tell people what they do not want to hear but need to know anyway—the clear implication being that journalism should serve the government and/or media organisations to deliver the prevailing views and consensus opinions of their masters. Contrary ideas and views are mere emotional responses.

That Otto is against debate is demonstrated by his reference to Lawrence Krauss's comments on presidential candidate Pat Buchanan professing to be a creationist:

"[There is] a growing hesitancy among both journalists and scholars to state openly that some viewpoints are not subject to debate: they are simply wrong. They might point out flaws, but journalists also feel great pressure to report on both sides of a 'debate'" (p. 160).

For Otto, the materialist scientist should be the only voice in the public square:

"When a television news program presents a split screen with a scientist on one half representing the knowledge accumulated from tens of thousands of experiments performed by thousands of scientists, and then presents a charismatic advocate with an opposing opinion on the other half, as if the knowledge and opinion carry equal weight, this creates false balance" (p. 165).

In fact, the author routinely presents those who disagree with the current scientific consensus as being anti-science.

Despite condemning the dressing up of opinion as science, Otto repeats the '97% of scientists agree on climate change' claim, which is ultimately a political rather than a scientific argument, and, in any case, the claim is false.¹¹

Evolution

Otto asserts that evolution "has nothing to do with belief or political

correctness; it has to do with evidence from observing nature ...” He adds:

“Modern medicine and biology are based on evolution Evolution is the most fundamental principle in biology, the one that unified it into an organized science. Without the theory of evolution, there would be no biology and no modern medicine. It connects and provides a framework for understanding all the disciplines within the life sciences, from genetics to virology to oncology to organic chemistry” (p. 212).

But Otto’s argument is based on equivocation: by ‘evolution’ he is actually referring to mutations, natural selection, and genetic drift, not molecules-to-man evolution. But the occurrence of mutations, natural selection and genetic drift are not unique to the theory of evolution. Creationists have no issue with any of these. They do not and cannot produce more complicated organisms.

Noting that creationists acknowledge the operation of ‘micro-evolution’—genetic variation within a species—but reject ‘macroevolution’—the gradual development of higher species from simple organisms, Otto cites Russian geneticist Dimitri Belyaev’s experiments on wild foxes beginning in the 1950s as having demonstrated macroevolution. But these experiments did nothing of the sort. The foxes remained foxes. They did not become something else!¹²

Nevertheless, Otto goes on to cite antibiotic resistance as proof of evolution: “We can see it working with our own eyes by watching viruses and bacteria evolve under the microscope. When one does, it becomes difficult to see how anyone could construe it as a matter of belief. It’s like saying, ‘I don’t believe in gravity’” (p. 218). But antibiotic resistance occurs not because of an increase in information but due to gene transference or mutations that destroy information,

causing a reduction in sensitivity to the antibiotic.¹³

Otto makes the presumptuous claim that top neurosurgeon Ben Carson (figure 2) suffers from confirmation bias and is unable to look at a problem from an evidentiary standpoint but instead seeks to find evidence that supports his Seventh-day Adventist faith because he believes the theory of evolution was ultimately inspired by Satan. Even if Otto was right about Carson, does he seriously believe that scientists who are materialists do not also suffer from confirmation bias and only seek evidence that supports their materialism? He also doesn’t explain how an anti-evolutionist could become a top neurosurgeon in the first place!

He goes on to state that science “doesn’t suggest order ‘just appeared’

out of nothing ...” (p. 211). Indeed, science doesn’t suggest this, but evolution does—because evolution is not science! He also argues that because cars are designed machines, they are not at all comparable to the processes of evolution. But the point is that although biological organisms are orders of magnitude more complex than cars, evolution posits that this complexity came into being by chance plus natural selection! Yet Otto naively insists that believing in evolution is “not an act of faith” (p. 212) because he (incorrectly) asserts it is supported by a “tremendous number of independent lines of evidence from a wide variety of scientific disciplines” (p. 212).

Otto also criticizes Michael Behe’s argument that many biological structures (such as the human eye) are

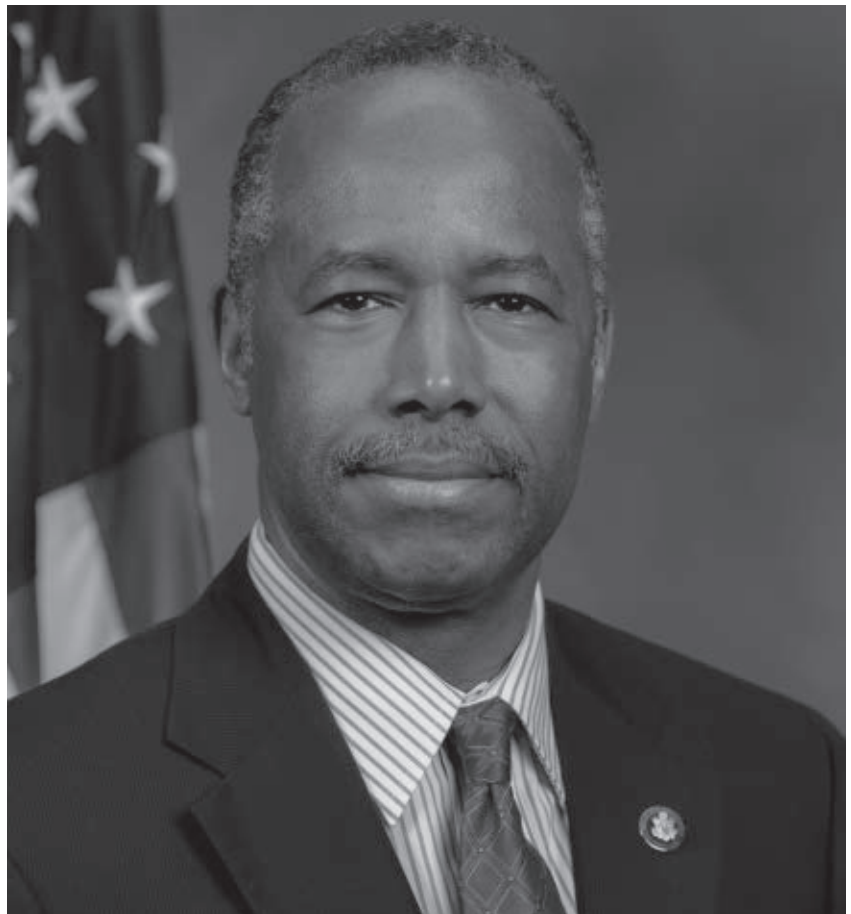


Figure 2. Otto attacks top neurosurgeon Ben Carson for his creationist beliefs, presumptuously claiming that his rejection of evolution is merely based on his faith rather than objective science.

irreducibly complex and therefore suggest Intelligent Design rather than random evolutionary processes. According to Otto, the eye is not irreducibly complex and “we can show with considerable evidence exactly how the eye evolved and is continuing to do so” (p. 221). His authority for this claim is another science writer, Carl Zimmer, but his claims are equally baseless.¹⁴

Otto claims the knowledge gained from evolutionary theory “helps us to be ... better computer programmers” (p. 213). As a professional systems and software engineer with formal qualifications in computer and information science and 25 years’ experience developing complex, real-time, safety-critical systems, I can assure you evolution has played absolutely no part in my work. In fact, the opposite is the case—systems are intelligently designed, not a result of haphazard or chance changes.

On accepting scientific truth claims

When it comes to persuading the public to accept the current scientific consensus, Otto suggests the problem may not be ignorance, but active ideological resistance. He notes that only 19% of college-educated Republicans accepted the scientific consensus on climate change compared to 75% of college-educated Democrats and concludes that Republicans’ rejection of the climate change consensus must be due to their political ideology. But this argument cuts both ways: Democrats may overwhelmingly accept the climate consensus because of their political ideology, e.g. because the solutions always seem to lead to more taxation and regulation, typically supported by Democrats. Alternatively, Republicans may have learnt critical thinking skills and understand that climate science is not based on empirical facts and evidence but Green ideology.

Regarding science education, the author writes:

“... we need to understand that some misconceptions about science are the result not of knowledge deficit but of belief resistance, and to devise ways to short-circuit these processes. That belief resistance—and this is a critically important point—is largely coming from adults. This is why education is political in the first place ...” (p. 244).

He goes on to claim that scientists are different from everyone else because they try to

“... set aside emotions, assumptions, and ideological predispositions and to adjust their worldview to a careful, detailed consideration of the evidence The desire for success in science instils the values of honesty and integrity, which are impossible to fully adhere to when making a rhetorical argument whose purpose is to win by a different standard” (p. 249).

But Otto’s characterization of science is breathtakingly naive, bordering on delusional. Scientists are not always objective. They have egos, and the possibilities of money, power, fame, and prestige, provide strong incentives to stick with and defend the consensus or else face isolation. There is in many ways a coercive consensus. Therefore, it is not surprising to find there have been many instances of scientific fraud.¹⁵ Indeed, Otto himself had already pointed to *The Lancet* publishing Wakefield’s fraudulent paper on vaccines and autism.¹⁶

Environmentalism and ‘climate science’

The author asserts that the modern ‘industrial complex’ is working to undermine scientific truth regarding the environment and climate in order to protect their massive industrial and commercial interests. The first example he offers is DDT, citing Rachel Carson’s crusade against the

insecticide on the basis that it allegedly caused systemic pollution, killed birds, and caused cancer in humans. None of this is remotely true as I have shown elsewhere.¹⁷ You can find old videos where people were sprayed with DDT, and the sprayers didn’t use gas masks, and suffered no ill effects. He adds that human-caused climate change has “profound existential stakes for the world’s most powerful industry (fossil fuels)” (p. 269).

Otto is clearly totally committed to the absolute truth of claims about anthropogenic global warming. He is convinced that thousands of scientists have measured and collected massive amounts of data using many different methods that all show increasing CO₂ levels have caused global warming and this could begin to “change climate patterns in ways that destabilise our economy, our national security, and social structures and our environment” (p. 271).

Otto claims that Michael Mann’s infamous ‘hockey stick’ graph was a categorical demonstration of the sharp increase in average temperature in the last half of the 20th century: “They represented classic observational empiricism. By proceeding logically from observations, they were able to create knowledge that could be tested and verified by others, which it was” (p. 296). He notes that Mann’s work has been severely criticized but dismisses the criticism as being motivated by interests other than the search for scientific truth. Mann himself has specifically pointed to a 2006 US National Academy of Sciences report that supposedly affirmed his findings.

But neither Mann nor Otto are telling the truth. Stephen McIntyre and Ross McKittrick have shown that Mann’s dataset “contained collation errors, unjustified truncation or extrapolation of source data, obsolete data, incorrect principal component calculations, geographical mislocations and other serious defects.” McIntyre and McKittrick used Monte Carlo

analysis (use of meaningless, random, test data) to demonstrate that Mann's defective data and unconventional methodology always generated a hockey stick graph! When these defects were rectified, Mann's own model "yielded a northern hemisphere temperature index in which the late 20th century is unexceptional compared to the preceding centuries, displaying neither unusually high mean values nor variability."¹⁸

In addition, meteorologist Hans von Storch, director of the Helmholtz Center in Hamburg and an IPCC lead author, has pointed out that the *National Academy of Sciences* report that Mann claimed supported his findings actually showed that Mann's methodology led to questionable historical reconstructions.¹⁹ As a result, the IPCC's Fourth Assessment Report (AR4, 2007) buried Mann's 'hockey stick' among many other projection curves, and the IPCC's Fifth Assessment Report (AR5, 2013) dropped it altogether. Thus, Otto's defence of Mann's work is misleading and not at all based on empirical, objective facts.

Otto dismisses claims by skeptics that there has been no warming over the last 10 years as a statistical trick used to fool audiences—"one of the most common tricks in science denial PR" (p. 300). He claims "one can pick *any* ten-year period and show no warming" (p. 300). However, the warming pause has actually lasted for more than 20 years. This has been confirmed not only in the UAH, Hadcrut4, and Hadsst3 datasets, but in the most accurate RSS satellite dataset. Otto is in denial!

He also appears to be blind in regard to scientific malpractice in the climate science field, including the modification and manipulation of source data.²⁰ Despite claiming that normal scientific practice allows other scientists to replicate scientific results, Otto ignores the fact that many top climate scientists have refused to make their data and models publicly

available, and asserts that attempts to obtain them through Freedom of Information laws are abusive and calculated to "harass and cripple scientists' operations, political reputations, professional focus, and relationships with their universities" (p. 318).

Conclusion

This book is full of false and misleading claims and bogus arguments. The author seems to believe that questioning the truth claims of scientists equates to the celebration of anti-intellectualism. In addition, his definition and discussion of how science operates, and its origin and history, are grossly inadequate and highly distorted. Moreover, the author is guilty of psychological projection: almost every accusation Otto makes against his opponents is just as applicable to him!

The book is an intensely ideological and political work that is uniformly critical of US Republicans, while praising Democrats. Indeed, the author expresses his elitist and authoritarian views when he asks "are the people still sufficiently well-informed to be trusted with their own government?" (pp. 11, 42).

Otto's aim was to demonstrate that there is a war on science, but his offering is merely a defence of scientific materialism and Marxist ideology. His work is effectively *a war on truth!*

References

1. Wells, J., *Icons of Evolution: Science or myth*, Regnery, Washington DC, 2000.
2. Mason-Jones, A.J. *et al.*, School-based interventions for preventing HIV, sexually transmitted infections, and pregnancy in adolescents, *Cochrane Database of Systematic Reviews* 11:2, 2016.
3. See Riches, V., *Sex Education or Indoctrination?* Family Education Trust, 2004; Weed, S.E. *et al.*, 'Abstinence' or 'Comprehensive' Sex Education?—*The mathematica study in context*, Institute for Research and Evaluation, 2007.
4. See Woodmorappe, J. *The Mythology of Modern Dating Methods*, ICR, El Cajon, CA, pp. 2–3, 1999.
5. Kulikovsky, A.S., Creationism, science and peer review, *J. Creation* 22(1):44–49, 2008; creation.com/peer.
6. See Stark, R., *How the West Won: The neglected story of the triumph of modernity*, ISI Books, Wilmington, DE, pp. 294–299, 2014; Spencer, R., *The Politically Incorrect Guide to Islam (and the Crusades)*, Regnery, Washington, DC, pp. 87–98, 2005.
7. See Stark, ref. 7, pp. 70–86.
8. Schirrmacher, T., The Galileo affair: history or heroic hagiography? *J. Creation* 14(1):91–100, 2000.
9. Graney, C.M., *Setting Aside All Authority: Giovanni Battista Riccioli and the science against Copernicus in the age of Galileo*, University of Notre Dame Press, IN, 2015.
10. Hartnett, J.G., The Copernican debate: science vs science not science vs religion (review of Graney, ref. 6), *J. Creation* 32(1):45–47, 2018.
11. See for example Epstein, A., '97% of Climate Scientists Agree' is 100% Wrong, *Forbes*, 26 Jan 2015, forbes.com; Woods, B., What Else Did the '97% of Scientists' Say? watsupwiththat.com, 18 July 2012, watsupwiththat.com; Monckton, C., 0.3% Consensus, Not 97.1%, 'Quantifying the consensus on global warming in the literature': a comment, Science and Public Policy Institute, n.d., pdfs.semanticscholar.org, accessed 2 August 2018.
12. Lightner, J.K., Selection for a behaviour, and the phenotypic traits that follow, *J. Creation* 25(3):96–101, 2011.
13. Bergman, J., Does the acquisition of antibiotic and pesticide resistance provide evidence for evolution? *J. Creation* 17(1):26–32, 2003.
14. See Doyle, S., Where are the emperor's clothes? creation.com/emperors-clothes, 10 January 2007.
15. Bergman, J., Why the epidemic of fraud exists in science today, *J. Creation* 18(3):104–109, 2004; creation.com/science-fraud-epidemic.
16. For many more examples of fraud and other problems with the peer review process, see Kulikovsky, ref. 5.
17. Kulikovsky, A.S., *Creation, Fall, Restoration: A biblical theology of creation*, Mentor Press, Fearn, Ross-Shire, pp. 262–264, 2009.
18. McIntyre, S. and McKittrick, R., Corrections to the Mann *et al.* (1998) proxy data base and northern hemispheric average temperature series, *Energy & Environment* 14(6):766, 2003. See also McIntyre, S. and McKittrick, R., The M&M critique of the MBH98 northern hemisphere climate index: update and implications, *Energy & Environment* 16(1): 69–100, 2005, for further responses to Mann's false claims.
19. See von Storch, H., The decay of the hockey stick, blogs.nature.com, 3 May 2007, accessed 31 July 2018.
20. See for example Lloyd, G., Temperatures plunge after BoM orders fix, *The Australian*, 4 August 2017, theaustralian.com.au; Booker, C., The fiddling with temperature data is the biggest science scandal ever, *The Telegraph*, 7 Feb 2015, telegraph.co.uk; Wallace, J.P. *et al.*, On the validity of NOAA, NASA and Hadley CRU global average surface temperature data & the validity of EPA's CO₂ endangerment finding, Research Report, June 2017 thsresearch.files.wordpress.com, accessed 1 August 2018.

One-sided discussion of theistic evolution

Faith and Fossils: The Bible, creation, and evolution

Lester Grabbe

Wm. B. Eerdmans Publishing Co., Grand Rapids, MI, 2018

Lita Cosner

In a lot of ways, Lester Grabbe's book fits the stereotype of the enlightened liberal proselytizing literature. He lets us know that a lot of Christians have no problem with evolution, and a lot of liberal theologians say we can't trust the Bible as history. He is qualified to tell us about this because he has the totally original testimony of being a former fundamentalist whose training in science and theology enlightened him into a new way of reading the Bible. And now *Faith and Fossils* will tell us why only primitive cave-people who barely know how to read would think that there is such a thing as a historical Adam, question evolution, or think that there was a worldwide flood.

Genesis is neither science nor history

Grabbe says that whatever Genesis is, it is "neither science nor history" (p. 12). He begins his book by a painfully literalistic reading of Genesis 1 which wonders how light can be separated from darkness, when darkness is the absence of light, and how there can be day/night cycles before the creation of the sun. This is one of several places in the book where he discusses things that are directly relevant to his specialization in Hebrew, but he gives no indication of actually bringing that expertise to bear on the subject at hand.

Grabbe argues that Enuma Elish is an earlier creation narrative than

Genesis, and he argues that Genesis is written as a polemic against the Babylonian text.

"The writer of Genesis 1 has turned the Babylonian version on its head. God does not fight active enemies as Marduk does but shapes and molds natural elements to produce an ordered cosmos. The Hebrew writer has deliberately told a creation story that asserts that the Hebrew God, YHWH, is sovereign over the gods of Babylonian mythology, which here become no gods at all. The forces of chaos have become lifeless elements that God shapes as he will" (p. 16).

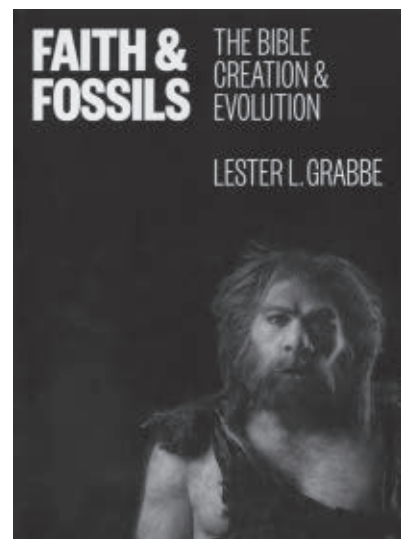
Of course, the assumption is that Genesis was written, at least the final version of it, much later in history than Mosaic authorship would allow.

Flood stories

Grabbe does much the same thing with the Flood stories. He demonstrates that many ancient cultures have Flood legends, which bear striking similarity to the Genesis account in many ways. He takes this to be evidence that, likewise, Genesis borrowed from these more ancient accounts. The idea that they might be cultural 'memories' of the same historical event does not enter into consideration.

Genetics and evolution

Grabbe has a very out-dated view of genetics and makes several statements that are flat-out wrong. He says "Baramin—creation according to kinds—is argued and defended in scientific terms". However, 'baramin' is a noun, and he gives the definition as a verb. That is a very odd mistake for a Hebrew professor to make. He points out that the Hebrew word translated 'kind' is used in various ways, including ways that differ



from the modern creationist use, as if that's a surprise to anyone. He says, correctly, "There is no certainty of animal types in the text" (p. 46), which would be a problem if anyone was arguing that Scripture gave any type of comprehensive taxonomy. But then he takes the bizarre lead to say "Then how much less can the text be argued to mandate that divine creation of individual kinds implies the impossibility of macroevolution?" (p. 46). He does not acknowledge that the language of creation of distinct 'kinds' which reproduce 'after their kind' rules out evolution's universal common ancestry.

Grabbe then pulls a weird bait-and-switch talking about Jewish rabbinic commentators, who are assumed to be "much closer to the time and perspective of the biblical writers themselves" (p. 50). Those rabbis said some things that were biologically impossible, which then somehow discredits the biblical texts they were commenting on.

Grabbe does not address the major genetic arguments of creationists, such as genetic entropy. He demonstrates a knowledge of whale evolution and vestigial organs that is at least a couple of decades out of date.

Evolution and evangelicalism

Grabbe makes the argument that while some scientists say that evolution

and Christianity are incompatible, some evolutionist scientists are Christian. He cites lots of theistic evolutionary biologists and geologists, but does not interact with the mainstream theologians and scientists who say there are problems with theistic evolution. He might have been expected to be familiar with some of the names and arguments featured, for example, in the 2017 book *Theistic Evolution*¹ even if the book itself came out too late for him to reference it.

How we most certainly didn't get the Bible

Grabbe's conception of how we got the Bible would be more at home in mid-1800s German universities than in modern-day scholarship. He states:

"There is, in fact, evidence that the Pentateuch was not compiled until the Persian period, probably in the decades after 400 BCE, though some of the material in it is much older" (p. 102).

He also vastly overstates the problem of textual transmission.

Grabbe inexplicably says that "knowledge of ancient Greek was rediscovered in the Renaissance" (p. 97). The Vatican maintained a library of manuscripts which included Greek texts, for one thing. While interest in Greek declined as Latin became the standard ecclesiastical language, it never completely vanished. As the British Library states:

"It is common to speak of the 'rediscovery' of Greek in the Latin West in the Renaissance, the implication being that Greek was wholly forgotten in the West for the bulk of the Middle Ages. While it is true that Greek was far less well known in the West between the 5th and 15th centuries, throughout this period we find evidence of knowledge of Greek on the part of a few learned individuals, and awareness of the *significance* of Greek on the part of many more. In the 7th century, the Greek-speaking Theodore of Tarsus (602–690) travelled to England to take up the role of Archbishop of Canterbury."²

Grabbe gives the LXX and MT differences in the Genesis 5 and 11 genealogies as a problem for biblical inerrancy (pp. 105–107). However, most biblical inerrantists, as well as the Chicago Statement on Inerrancy, would limit inerrancy to the originals, meaning that variants that arose later are not a problem. There are inerrantists on both sides of the textual debate.

He also claims that NT quotes of the OT that are different from the MT are a problem for inerrancy (pp. 108–110), but they fall under the same category. Either the MT is original, and the NT authors are quoting the LXX, thus making that LXX reading authoritative *New Testament* Scripture while not affecting the biblical status of the MT reading, or the LXX reading is actually original and the copyist error arose in the MT, meaning that the LXX reading reflects the original, inspired Hebrew reading. And such instances are usually very minor and do not involve a radically different meaning.

Adam and human ancestry

Grabbe's understanding of anthropology is significantly flawed. He does not recognize Neandertals as human (figure 1), despite the evidence of many human behaviours such as artistic expression, ritualistic burial of the dead, and technological innovation. Nor does the fact that Neandertals are the ancestors of a significant portion of humanity factor in (p. 119). He buys into the myth that humans and chimps share 96–99% of their DNA, and that this proves common ancestry (p. 122).

The biblically literate person, at this point, may remember that the Genesis creation account says that the first two humans, Adam and Eve, were special creations of God in a way that does not lend itself to common ancestry. Grabbe demonstrates admirable consistency in using decades-old arguments that do not respect the best work in the field. He gives a laughably simplistic exegesis of Genesis, where he apparently does his best to avoid looking like a Hebrew professor at a not-insignificant university (and he succeeds admirably!).

It doesn't get any better when he moves to the writings of the Apostle Paul. He conflates allegory and typology. To explain Romans 5 (typology), he moves to Galatians 4 (allegory), but then even manages to botch an exegesis of allegory. He asks, "Is Paul trying to tell us that there was a literal, historical Isaac and a literal, historical Ishmael? Is that his purpose?" (p. 136). To which the biblically literate individual would say, "No, he's *assuming* their historicity, and using that as a jumping off point to make a theological point." But that wouldn't fit the vibe he's been going for this entire time, so he says, "Of course not. He is using figures from the book of Genesis to make a point" (p. 136). Well, yes ... but anyone who says that Paul, a super-conservative Pharisee turned Christian apostle, Hebrew of Hebrews, does not believe that Adam, Eve, and every other historical figure from the Tanakh is as real as you or me has apparently never cracked open a Bible.

Grabbe asks, "Why should we assume that Paul had a modern knowledge of science?" (p. 138). Because that's the dichotomy—either you have to believe that Paul was an ignoramus with no idea about anything resembling the most basic proto-scientific ideas (despite his having the best education from the Greek *and* Jewish standpoints), or he knew everything we know with the benefit of electron microscopes, telescopes, and germ theory.

What you have to give up to be a Christian evolutionist

Grabbe says, "Assumptions of 'inerrancy' are patently untenable when



Figure 1. A reconstruction of a Neandertal child, which Grabbe does not accept as fully human

Image: Wolfgang Sauber/CC BY-SA 4.0

we recognize the history of the text” (p. 153). So if you want to be a Christian evolutionist, you have to believe the Bible has errors, that people who sure sound like they’re being described as historical characters are actually “characters in a theological narrative” (p. 144)—and by the way, ‘theological’ is being used to mean ‘not historical’.

This wouldn’t be a problem if there was some sort of pre-history/historical split—as if Moses (oh, sorry—I meant the Persians) put a statement somewhere in the Pentateuch that says, “Ok, that was all myth and theology—the history starts here!” Except it’s not clear where the history starts in Grabbe’s view. What about the genealogies of Jesus? Because Jesus is a direct descendant of Adam (Luke 3). And Jesus thought Abel was a real person, and that Noah’s Flood actually happened. Was Jesus wrong? If Jesus was wrong there, what else was He wrong about? And if we’re using the scientific understanding of [insert current date here] as our barometer for what’s true in the Bible, what do we do with the virginal conception of Christ? What do we do with the Resurrection? I mean, if we’re discarding all the stuff that Richard Dawkins thinks is silly, he’s not even sure that Jesus is historical!

This is a good book to get to see the standard arguments against creation that are still being used, even by people who should know better. Grabbe is an emeritus professor of Hebrew at a not-insignificant university, whose book is published by Eerdmans, which is one of the major theological publishers. This makes it all the more disappointing that every page is littered with misrepresentations, outdated arguments, and outright falsehoods.

References

1. Reference to *Journal of Creation* review
2. O’Hogan, C., Knowledge of Greek in the medieval Latin West, British Library, bl.uk/greek-manuscripts/articles/knowledge-of-greek-in-the-medieval-latin-west, accessed 7 November 2018.

Field of evolutionary psychology explains why theistic evolution and Darwinism are incompatible

Darwin, God and the Meaning of Life: How evolutionary theory undermines everything you thought you knew of life

Steve Stewart-Williams

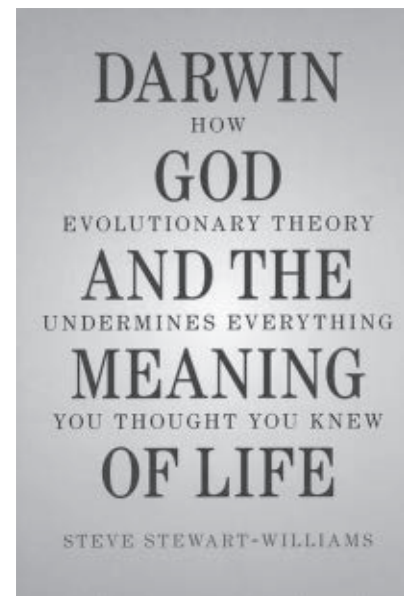
Cambridge University Press, Cambridge, 2010

Benno A. Zuiddam

Can the idea of God, as the monotheistic religions have it, be reconciled with evolutionary science? This question was carefully considered by Charles Darwin and has been by many scholars since. If God created Heaven and Earth and evolution is true, then God must have made the world by means of evolution.

While theistic evolution is certainly the solution opted for by a vast majority of contemporary theologians to ease tensions between religion and science, the scientific validity of this choice is questioned by the field of evolutionary psychology. On the contrary, if Darwin was right and common descent of all living species is a fact, then it is far more likely that we find ourselves in a universe without God, purpose, or objective moral values. Theistic evolution is at best a scientifically irrelevant personal conviction. It is essentially religious, not scientific.

This devastating verdict on theistic evolution comes from an unusual source—a book published by Cambridge University Press and



written by a committed evolutionist. Dr Steve Stewart-Williams was born in Wellington, New Zealand, and presently serves as lecturer in evolutionary psychology at the Malaysia campus of the University of Nottingham. While not a friend of creationism by any stretch of the imagination, his book shows that theistic evolution is not a realistic alternative. Stewart-Williams demonstrates that the theory of Darwin, also in its modern formats, cannot be reconciled with the traditional monotheistic religions.

Darwin's departure from theistic evolution

For historians this condemnation of theistic evolution does not really come as a surprise. Those familiar with

Charles Darwin's life are aware that his personal struggles to reconcile God and evolution were profound, if only to save face with his contemporaries and not to antagonize his theistic (Unitarian) wife, Emma. However, as Darwin made progress in defining the mechanism of natural selection and understood its implications, he gave up on religion and God.

With the publication of his *Origin of Species* (1859), he still presented himself like a theistic or perhaps a deistic evolutionist. This may have been due to the social pressures of his day and age, as every respectable person in Victorian times was supposed to believe in God as Creator. However, even decades before this he had genuine doubts about God and nature. A memo from Emma (dated January 1839) confirms this. It is clear that already by then Darwin had honest and conscientious doubts about God (even in her Unitarian sense) and was giving up on the possibility of divine revelation altogether. Darwin always kept his wife's memo and added the following in his own handwriting and with his initials: "When I am dead, know that many times I have kissed and cried over this."

In his later years Darwin may best be described as an agnostic. He had given up on the idea of God in the traditional sense altogether. This wasn't malice, but the result of a genuine intellectual struggle. Charles Darwin did not develop his theory to destroy Christianity or religion from the outset. Like many since, he merely discovered that evolution and traditional religion could not both be true. While it is technically possible to believe in evolution and theism at the same time, this does not make for a good or even preferable solution.

Separation of faith and science

Considered at first glance, theistic evolution presents itself as the perfect answer to apparent contradictions between scientific theories and faith

in God. It only seems to take the relatively small sacrifice of no longer reading the Genesis account literally, but metaphorically. As fairy tale with a beautiful historic message: God is responsible for our existence. Theistic evolutionists differ on the extent that God interferes with the universe and current affairs, but for all of them God is the great mastermind behind evolution. Natural selection is God's tool. Famous names are counted among their number, including Ronald Fisher, Theodosius Dobzhansky, and Francis Collins.

One of the main characteristics of theistic evolutionism is the conviction that faith and science are completely distinct fields with different realities as their object of research. 'Non-overlapping magisteria' summarized Harvard professor Stephen Jay Gould—an agnostic himself.

As a psychological construct, this distinction seems to work, but at a practical level it invites several objections. The main reason that faith and science are considered non-overlapping fields is not because they are, but because evolutionary theory has gained a virtual monopoly and pushed out any practical notion of God as a reality from the exact sciences.

Science used to approach God quite differently. Before the Enlightenment and the age of rationalism, faith and reason were not separated, but integrated. If evolution were true, this would indicate that the idea of theistic evolution constitutes a break with the entire history of human life, as far as we know it. Before the 18th century, followers of any major monotheistic religion believed that God had authoritative views on politics, agriculture, stewardship, warfare, civil and criminal justice, how kings should rule, etc. Religion was not restricted to a private opinion in church on Sunday. Christianity wasn't looked upon as a non-government organisation that was useful from a civic perspective for encouraging voluntary service

and charity. Quite the contrary, all universities in Western civilization considered theology the queen of the sciences. All other fields dealt with fallible theories flowing from human thinking, experience and observation, but theology had the infallible Word of God as its object of research. This was considered a far more reliable source of truth than any human scientific endeavour. If an omnipotent and omniscient Creator existed and spoke to mankind, then He was likely to know better than mere mortals.

Theistic evolution breaks completely with these traditional concepts of Western civilisation, if not in theory then in consequence. Stewart-Williams points out that theistic evolution always results in discarding parts of the Bible. Not that the words are denounced necessarily, but theistic evolutionists attach new meanings to the ancient texts, which their original writers did not intend to convey. Normal linguistic rules seemingly no longer apply and the history of the reception of the text is ignored. This used to be called 'eisegesis' or '*Hineininterpretierung*' in German, but for some reason this is considered philologically acceptable even when it is not. This has led to a virtually worldwide inferior practice. Faithfully establishing the message of the ancient texts to its original readers is no longer the object of research, but the meaning that 21st century readers wish to derive from Scripture is the new focus.

Misinterpretation of Scripture

Admittedly, the Bible is not a textbook for physics or biology, but Stewart-Williams expresses his frustration about hearing this statement *ad nauseum* from educated Christians who go into theistic-evolution default mode. The evolutionary psychologist considers it rather simplistic to propose that Scripture only intends to convey *who* made the heavens and the earth, including all living species (p. 62).

He points out that a non-prejudiced reading of the Bible would indicate that the *how* of creation is of essential importance to the texts, not only in Genesis, but throughout Scripture. There is actually a reason that Jews and Christians always took these texts literally, for thousands of years until Darwin arrived on the scene. A coincidence? Not likely, according to Stewart-Williams.

Theistic evolutionists might object that evolution actually helped theologians to arrive at the 'true message' of the Bible, winnowing out the wheat from the chaff as it were. But how likely is this? Would it not be more realistic to admit that the human authors of Scripture were wrong, not intentionally, but because of their less advanced knowledge and primitive worldview? Would it not be far more courageous to acknowledge that the Bible is a book with lots of factual and historical mistakes? Consequently, where theologians claim to have more knowledge and a more accurate worldview than the writers of Scripture, they assume the role of intermediary priests who correct the ancient doctrines and traditional texts as they see fit. Scholars today do not only know more than the Apostles, but also claim to know better.

It is refreshing to listen to a neo-atheist view on this topic. Stewart-Williams does not mince his words:

"The idea that the biblical stories are symbolic is charitable to the point of absurdity. What would we think of a university professor who, happening upon unambiguous errors in a favourite student's work, concluded that the student was speaking symbolically and awarded her top marks? The whole notion that Genesis is metaphorical, and that evolution is a testament to the glory of God, smacks of the kind of spin doctoring that gives politicians a bad name. Liberal Christians alter their original religious beliefs to make them compatible with

evolutionary theory, and then scoff at the idea that there was ever any threat. In doing so, they casually downplay just how radically they've rewritten their religion. Arguably it is not the same religion as the one it evolved from; it merely shares the same name" (p. 63).

The evolutionary psychologist doubts whether there is essential agreement or continuity between theistic evolution and core doctrines of the monotheistic religions. Theodosius Dobzhansky, for instance, was a prominent theistic evolutionist, and even resorted to pseudo-theological arguments for evolution.¹ But he rejected the existence of a personal God and the possibility of life after physical death.

Stewart-Williams concludes that one golden rule always seems to apply in theistic evolution: evolution always takes precedence over religion. Civilization still awaits the birth of the first theistic evolutionist who starts to believe more of the Bible instead of less. It seems to inevitably be a one-way road where faith concedes.

Wishful thinking or science?

For evolutionary psychology though, the main problem with theistic evolution is that it is scientifically incompatible with the main feature of Darwin's theory: random natural selection. The driving force behind the theory of evolution is that there is no intelligent design or intended architecture of the species at all. Viewed from this angle 'theistic evolution' is a contradiction in terms. Darwin's theory does not allow for intentional causes or purposes in evolution. It may look like that in hindsight, but this is only imaginary, because the operating mechanism tells us differently. No goals, chance mutations only.

Stewart-Williams considers the introduction of divine guidance for the process of evolution inconsistent with

the heart of Darwin's theory, a form of wishful thinking really. Theistic evolutionists wish to cling to God for other than scientific reason, while claiming a scientific premise. Classical Christianity also believed in primary causes and in predestination and the divine governance of all things as a mystery of faith, at times seemingly against all hope and facts. There was, however, a striking difference with theistic Darwinism in worldview and scientific premises. It also had a different epistemology. The thinking of traditional Christianity was based on the conviction that God's Word is a reliable source of knowledge that can be accessed scientifically. Theistic evolution no longer shares that basis.

A second scientific problem for evolutionary psychology that makes theistic evolution highly unlikely is the present state of nature. There are manifest imperfections in the alleged 'design' of living creatures. Theistic evolution essentially discards the traditional doctrine of the Fall and a universal curse. It extrapolates from the present state of this world to the original creation. It therefore fails to give secular evolutionists an acceptable explanation for the imperfect state of nature and the 'wicked' processes that natural selection adopts. If God is responsible for the world in its current state, this reflects poorly on a good and almighty Creator.

Secular Darwinism has perfectly acceptable explanations for imperfections after random mutations, but this ceases to make sense if this process is led by an almighty hand. For this reason, evolutionary psychology fails to regard theistic evolution as an improvement of Darwin's theory. Instead of explaining more, it only produces extra questions and complications. From a scientific point of view this is not preferable.

In addition to this, from a theological point of view, the problems flowing from the theistic evolutionist position requires a complete

re-evaluation of one's concept of God. The traditional Gospel of creation, fall, and redemption ceases to make sense because it is no longer factual. Stewart-Williams insists that if the world was created imperfect (including death and sin, amongst other things) this dictates another view of God than is held by the big monotheistic religions. The reality of nature does not point to a good and almighty God, but rather contradicts this. For this reason several theistic (and deistic) evolutionists have openly replaced classical faith in a personal God with a non-personal power: "May the force be with you." This is essentially the 'god' of Einstein, Dobzhansky, and George Lucas.

For the greater good?

Another problem for evolutionary psychology is the field of ethics. Darwin's theory explains morality as resulting from choices that are ultimately driven by the outcomes (successful or unsuccessful) of random mutations in specific situations. In other words, Darwinism dictates situation ethics, non-surprisingly in an age of modernism and post-modernism.

Darwin, God and the Meaning of Life demonstrates how evolution undermines the concept of human dignity (pp. 258–279), as well as any form of thinking about good and evil in absolute terms. This should have been clear 150 years ago, with the publication of Darwin's *Descent of Man* (1871). If one truly embraces evolution, there is no longer any absolute good or wrong. It is even questionable whether human guilt exists at all or only lies in the mind of the beholder. Mankind is predetermined by random mutations and circumstances; today scientists conclude that even our genes are. Nietzsche grasped this at an early stage. To his mind, people still said they believed in good, evil, sin, and

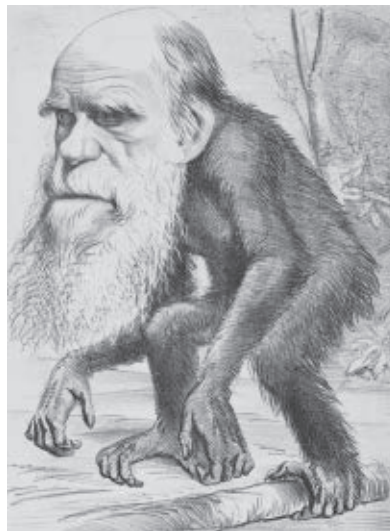


Figure 1. "A Venerable Orang-outang", a caricature of Charles Darwin as an ape published in *The Hornet*, a satirical magazine. Date 22 March 1871

guilt, but in principle these things no longer existed objectively.

As a neo-atheist, Stewart-Williams is personally content with this state of affairs. To him this does not mean that man is an immoral being or that evolutionists are bound to lead a dissolute life. It does imply, however, that any objective measurement of good or wrong is impossible. Evolution destroys ethics in the traditional sense, and replaces objective moral law with situation ethics. The guiding principles for choices are only found in a specific context, as the next step on the evolutionary staircase and genetic consequences are considered. Moral choices and conventions are no longer moral in the classical sense, but at best a social contract between people, not unlike the rules of chess or other board games.

For Stewart-Williams, utilitarianism or the quest for 'the greater good' is the new norm. While he insists that avoiding suffering and promoting happiness lack any philosophical foundation as such after Darwin, they should still be defended on practical grounds as a personal choice (pp. 305–307). Unfortunately the author ignores the fact that there was a time when

his views were almost universally implemented in the scientific world, in the US eugenics programs of the 1930s as well as in Germany and Russia around the same time. But this might be one of the chances that mankind has to take while natural selection presses on towards the greater good.

Reflection

While *Darwin, God and the Meaning of Life* delivers a devastating verdict on the theory of theistic evolution, its analysis also invites self-reflection for Christians who are committed to the classical view of creation. To what extent is the Lord (and his Word) no actual part of our thinking and actions, but only a theory we adhere to? Even if we claim to embrace truth and divine revelation, are we willing to take all facts into account? Are we willing to be corrected, even by atheists if that be the case? Scholars like Stewart-Williams may have reason to be appalled at Christians who preach creation, but who advertize survival of the fittest and utilitarianism by their actions.

References

1. Dilley, S., Nothing in biology makes sense except in light of theology, *Stud. Hist. Philos. Biol. Biomed. Sci.* **44**(4/B):774–786, 2013 | doi:10.1016/j.shpsc.2013.06.006.

Megasequences and the floating forest hypothesis: part 1

Dr Timothy L. Clarey's perspective¹ on critiquing the floating forest hypothesis by using his proposed version of how megasequences were created by super tsunamis should be examined critically. Clarey accepts the names of the megasequences on the North American continent as given by Sloss.² He also accepts the stratigraphic boundaries and erosional nature of them as related by Sloss.³ He uses a diagram on how the sea level relates to the six megasequences that is a bowdlerized version of the isomorphic one Sloss developed.³ In so doing, he should consider the following.

Sloss's diagram has at least 55 regressional episodes on it representing the six megasequences. (At least 13 of these are in the Sauk megasequence.) This is simply a recording of empirical data. Sloss also mentions regression explicitly at least 31 times in his article, with many more implied references. He repeatedly has statements concerning regression like the following one referring to the base of the Tippecanoe, which he says was "interrupted by numerous partial regressions"; or the one concerning the base of the Absaroka where he points out "there is every evidence of numerous transgressive episodes separated by regression and erosion to form a complex of intraregional and intrasequence unconformities". How then can Clarey continue to assert there were six major tsunamis which swept over the Transcontinental Arch (his Dinosaur Peninsula)?⁴ Due to quantitative considerations and physics, these imagined super tsunamis are already questionable. Did these tsunamis have multiple episodes of

reversals in them as they swept over the continents, or does Clarey have his own set of field data that differs from the well-accepted ones used by Sloss? Are we to accept the hand-drawn smoothed curves of sea level as used by Clarey as representing reality?⁵ Does Clarey accept paraconformities as erosional surfaces despite the overwhelming evidence to the contrary?⁶

Regarding boundaries of megasequences, Clarey accepts the boundary between the Kaskaskia and Absaroka megasequences as being near the middle of the Pennsylvanian (or Upper Carboniferous).³ This is simply preposterous from a catastrophic point of view, but not from a uniformitarian one. Did the mechanism for the deposition of these coal beds have a hiatus in the middle of the cyclothemic deposition of them? Where is the field evidence for this?

Clarey's conjecture of Lycopod trees likely fringing the "land/sea boundary along the outer edges of the peninsula",⁷ that is his Dinosaur Peninsula, needs to be quantitatively evaluated. With the Moscow and Michigan coal basins both exhibiting over 230 layers in them, one might reasonably believe this is something of a universal number for the Northern Hemisphere. If this be so, then any rational estimate of the extent of Clarey's fringing lycopod forest can only explain a small fraction—not of the whole Carboniferous deposits in the United States—but of 1% of them! Also, although the idea of a continent-fringing forest, first proposed by the evolutionist Kuntze,⁸ might be considered a logical way to account for the volume of coal in Carboniferous layers if long ages are assumed, there is absolutely no field evidence to suggest this.⁹ Regarding the hundreds of Carboniferous layers in coal measures or cyclothems, how many does Clarey believe have relic soils and what does this do to his catastrophic perspective?¹⁰

The excellent and extensive chemical analyses performed by Kuntze unequivocally point to a marine environment for the Carboniferous coals.⁸ This is pinpointed more precisely by Woolley,¹¹ and is confirmed by such abundant fossil evidence as the millions and millions of *Spirorbis* fossils found at the former town site of Linton, Ohio. These and numerous other facts presented by the aforementioned authors (a review of which is beyond the word limitation of this letter) and Dr Joachim Scheven certainly make Clarey's evidence-deficient and qualitative conjectures untenable and have not been addressed by him.

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References

1. Clarey, T.L., Floating forest hypothesis fails to explain later and larger coal beds, *J. Creation* 31(3):12, 2017.
2. Sloss, L.L., Sequences in the cratonic interior of North America, *Bull. Geol. Soc. Amer.* 74:93–114, 1963.
3. Clarey, T.L., *Dinosaurs: Marvels of God's Design*, Master Books, Green Forest, AR, 2015.
4. Clarey also has the flood waters in his imagined scenario detouring around the Transcontinental Arch for all six megasequences, while Sloss tells us the Absaroka megasequence (which was followed by two others) is the one which records "the disappearance of the Transcontinental Arch as a controlling element in the distribution, facies, and thickness of preserved sediment". *Acts and Facts* 41(12):16, December 2014.
5. The author knows of no smoothing algorithms that would be able to produce Clarey's curves from those of Sloss unless there were numerous multiple ones used in a disingenuous patchwork manner on Sloss's data. Also Clarey, who has reduced each megasequence to a simple transgressive episode, has the audacity to accuse 'secular geologists' of doing the same thing—without, of necessity, producing any references to back this up. Clarey, T., *Grappling with megasequences*, *Acts and Facts* 44(4):18, April 2015.
6. Roth, A.A., 'Flat gaps' in sedimentary rock layers challenge long geologic ages, *J. Creation* 23(2):76, 2009.
7. Clarey, T. and Tomkins, J.P., Sinking the floating forest hypothesis, *Acts and Facts* 46(8):10, August 2017.
8. Kuntze, O., *Phytogeogenesis: Die Vorweltliche Entwicklung der Erdkruste und der Pflanzen in Grundzügen*, P. Froberg, Leipzig, Germany, 1884.

9. Field evidence would have to involve a linear (or linear trending) line (or series of broken line segments) demonstrating terrestriality. Nothing approaching this has been observed to date, so one could reasonably conjecture that the majority of the floating forest was not continent fringing.
10. The experience of Joanna Woolley and the author in examining hundreds of coal seams over the numerous basins in the United States is confirmed by others: the so-called relic soils are usually not there and can be best accounted for as a product of diagenesis.
11. Woolley, J., The origin of the Carboniferous coal measures—part 1: lessons from history, *J. Creation* 24(3):81, 2010.

Megasequences and the floating forest hypothesis: part 2

Dr Timothy L. Clarey has been concerned for some time with megasequences and the floating forest. His latest article¹ could well be supplemented by a discussion of the link between these two. Such a discussion might run along the following lines.

Sloss's seminal article² defining megasequences on the cratonic interior of the North American continent contains a wealth of empirical data from all the previous stratigraphers who have worked on this problem. Rather incredibly he blatantly admits the failure of the fossil evidence in an evolutionary paradigm to be able to be used to correlate stratigraphic layers over regions. In particular he noted that such attempts applied over widely scattered localities on the North American continent have "resulted in complex and apparently inconsistent correlation charts" which "appear to bear no close relationship to one another in terms of the time-stratigraphic correlation of the strata involved. As a result, interregional relationships form an apparently chaotic pattern. The interpretations suggest an almost random distribution of unconformities in both space and time."² He threw out biostratigraphy

and relied on a purely stratigraphic approach to define six megasequences related to what he surmised were ancient sea levels defining nearly continental unconformities revealing "no evidence of discontinuity in the rocks themselves either by nondeposition or erosion".² What he did not do was recognize that paraconformities are not erosional surfaces, but rather depositional ones.³ Coupled with this, he retained the notion of eons of geologic time. It was his expectation that future workers would modify the number of his megasequences or at least some of their boundaries.

One logical way to reintroduce the fossil evidence into the concept of megasequences would be to start with the silvomarine hypothesis of Kuntze⁴ and work outward, that is stratigraphically both upward and downward, from there. This would be from a catastrophic perspective which would properly account for the paraconformities and start on scientifically characterizing the complexities of sedimentation of a worldwide flood as evidenced on the North American continent.

Results from exercising Woolley's model⁵ of a lycopod and a realization of the three-layered nature of its existence automatically take into account the whole extent of sediment of the coal measures, including all coal, sandstone, shale, limestone, and whatever little clay there may be. The lycopods have that much buoyancy. No vague appeal to other methods of sedimentation is necessary. It also allows for an extensive underpinning of marine organisms like crinoids. The violent shaking of the floating forest might explain the existence, nature, and complexity of the crinoid-rich Mississippian strata beneath the Pennsylvanian. It would also solve Sloss's difficulties with (and disagreements with other stratigraphers about) a supposed continent-wide unconformity at the

base of the Mississippian. Furthermore, a quantitative estimate of basin spacing based on the nodes and antinodes of elastic vibration of the asthenosphere between orogenic discontinuities would explain their distribution and, more importantly, the absence of deposition between them without an appeal to restrictively parochial and ill-timed mechanisms.⁶

The recognition of the almost-always rootless nature of North American Devonian fossils points to a downward extension of the megasequence boundary to Sloss's Kaskaskia-Tippecanoe one. Likewise, the amphibian-rich fossil concentration of the Permian speaks of another aeolian or aquatic episode in Flood history that logically extends the megasequence boundary up to the prominent one shown by Sloss at the Permian-Triassic boundary. The distribution of the concentration of fossils from west to east hints at something like the momentum-conserving violent collapse of the earth's vapour envelope.⁷ Many of these speculations need to be made more quantitative and need to be checked with field studies. Further emendations to Sloss's megasequences are outside the field of discussion of this letter.

It is surprising Clarey would think the excellent work done by Dr Steven A. Austin on the tree mat formed on Spirit Lake from the eruption of Mount St Helens in 1980 could somehow be used to invalidate or restrict the floating forest theory when over a century earlier Kuntze used a similar mat in a European lake as evidence for it. Whereas it is very disturbing Clarey ascribes the belief of completely hollow lycopod trunk and root structures "based primarily on speculation" to all supporters of the floating forest hypothesis who "do not take into account a number of [necessarily not referenced] key reports describing the non-hollow internal structure of lycopods",⁸ when six

years earlier floating forest supporter Woolley recorded fossil evidence for the non-hollow interior of *Stigmaria* and used an estimate of the density of the in-filling in a quantitative model for the whole lycopod⁵ in a paper later referenced by Clarey.⁹

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References

1. Clarey, T.L., Floating forest hypothesis fails to explain later and larger coal beds, *J. Creation* 31(3):12, 2017.
2. Sloss, L.L., Sequences in the cratonic interior of North America, *Bull. Geol. Soc. Amer.* 74:93–114, 1963.
3. Roth, A.A., 'Flat gaps' in sedimentary rock layers challenge long geologic ages, *J. Creation* 23(2):76, 2009.
4. Kuntze, O., *Phytogeogenesis: Die Vorweltliche Entwicklung der Erdkruste und der Pflanzen in Grundzügen*, P. Froberg, Leipzig, Germany, 1884.
5. Woolley, J., The origin of the Carboniferous coal measures—part 3: a mathematical test of lycopod root structure, *J. Creation* 25(3):78, footnote 5, 2011.
6. See, for example, Clarey, T., Fountains of the deep, *Acts and Facts* 43(12):16, December 2014.
7. The vapour canopy theory has been criticized as not being practically viable. However, this was done by using results from the application of numerical techniques. These powerful methods have the drawback of being hypersensitive to boundary conditions and element shapes: in the author's industrial experience such revealing calculations were only accepted after an experimental test verified them. Real working scientists very infrequently 'abandon' a hypothesis, only assigning it a lower probability in their (unfortunately named) fuzzy logic scheme when difficulties might be thought to have surfaced.
8. Clarey, T. and Tomkins, J.P., Sinking the floating forest hypothesis, *Acts and Facts* 46(8):10, August 2017.
9. Clarey, T.L., Examining the floating forest hypothesis: a geological perspective, *J. Creation* 29(3):55, 2015.

» Timothy L. Clarey responds:

I appreciate the two letters to the editor concerning my recent paper about coal beds in Cenozoic rocks, although very little of either of the letters was about my paper. Instead, most of the criticism seemed to be addressed at my stratigraphic and megasequence research.

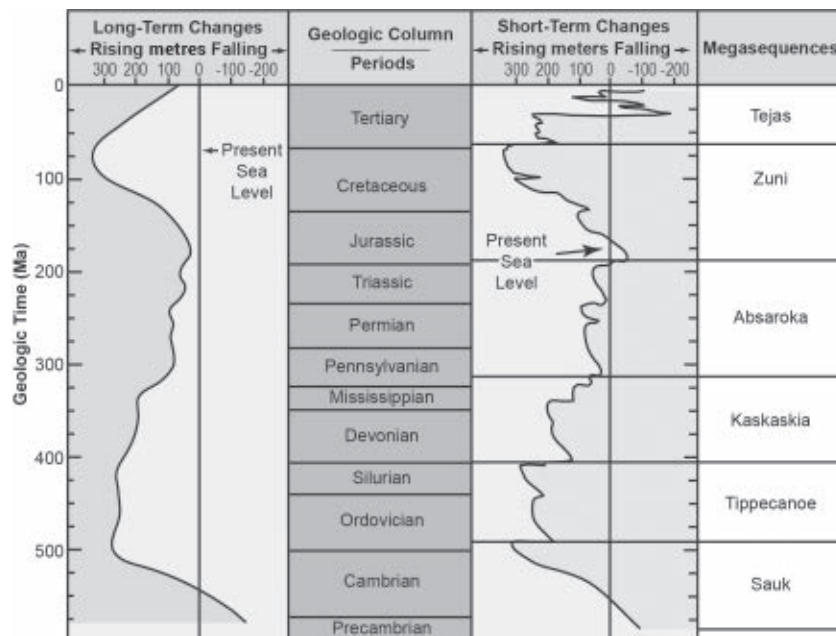


Figure 1. Original uncorrected secular megasequence/sea level chart used in many of my previous publications

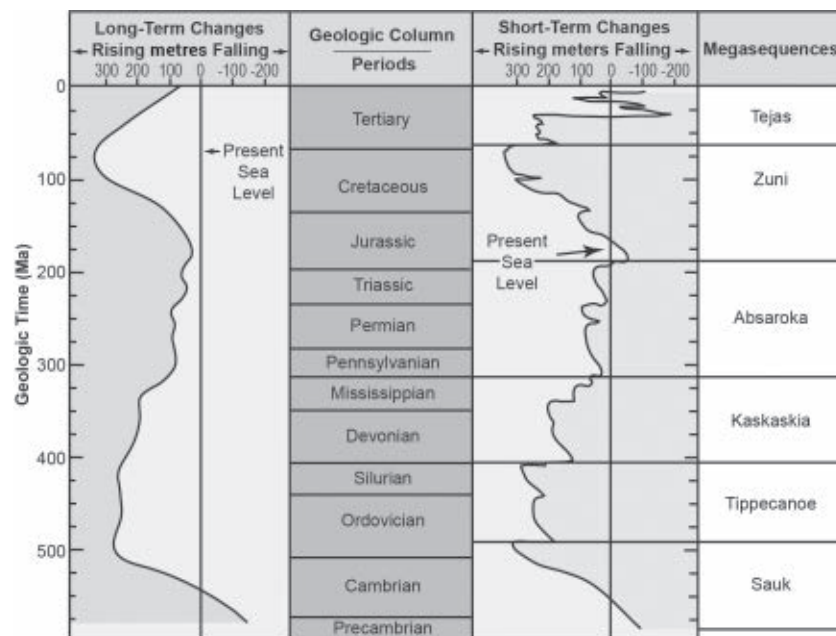


Figure 2. Corrected secular megasequence/sea level chart showing the proper stratigraphic position of the megasequence boundaries

First, the author refers to several errors in the megasequence/sea level chart used in many of my publications and implies I drew it freehand myself (figure 1). I did not. This megasequence chart was used first by Dr Andrew Snelling in many of

his publications, going back at least a decade.¹ Furthermore, he obtained the chart from a secular publication where they, not him, had simplified the sea level fluctuations.²

I readily admit the chart is slightly off on some of the megasequence

boundaries, whether by accident or oversight. I did correct the Tejas megasequence boundary but never adjusted the levels of some of the other boundaries. For example, the accepted boundary for the bottom of the Absaroka megasequence should be at the base of the Pennsylvanian System and not in the middle of it. And to my knowledge, there is no accepted megasequence boundary at the Permian-Triassic boundary as the author claims. The Absaroka begins at the base of the Pennsylvanian and ends in the Lower Jurassic. Figure 2 shows the corrected version of the secular megasequence/sea level chart with the megasequence boundaries in the correct stratigraphic positions.

Remember, the sea level curve is a smoothed curve, and is not meant to show every minor fluctuation in sea level. It was never implied there were only six tsunami waves. Megasequences represent major advances of water across the continents and include numerous minor fluctuations not shown by the simplified diagram.

Also, in the first letter, the author uses an older reference of mine³ that shows all six megasequences thinning across the Transcontinental Arch/Midcontinent Rift, east to west in Minnesota. In my subsequent research I have shown that indeed, the Absaroka and the Zuni megasequences did blanket most of the southern part of this uplift.⁴

Moreover, the author never provided a reference for his unsubstantiated statement of “over 230 [coal] layers” in the Moscow and Michigan Basins. I grew up in Michigan and saw some of the exposed coals firsthand. I have never heard of, or observed anywhere, 230 separate coal seams in the Michigan Basin. The limited coal beds present are only a few centimetres to a few metres thick and are all in the Pennsylvanian System or Upper Carboniferous (Absaroka).

Furthermore, in the second letter, the author implies that I used Steve Austin’s Spirit Lake research to invalidate the floating forest hypothesis. To the contrary, the Mount St Helens floating log debris mat is merely the model I use to explain coal beds. I fully support the allochthonous origin of coal as Austin described at Spirit Lake. These findings were never used to reject the floating forest hypothesis. They were used to point out that a highly speculative pre-Flood floating forest biome is unnecessary to explain the origin of coal.

Finally, my *CRSQ* article, co-authored with Dr Jeff Tomkins, explains that lycopod trees were not hollow as some creationists have asserted based on the secular literature and an analysis of stigmarian root fossils.⁵ Many lycopod trees had the soft parenchymatous tissue between the central vascular stele and the outer periderm decomposed and the space filled with sediment either during transport or *in situ* (e.g. Fossil Grove, Scotland).⁵

My first paper in *J. Creation* criticizing the floating forest hypothesis identified several geological problems that have yet to be addressed by advocates of the floating forest.⁶ These two letters are no exception. My geologic criticisms have been completely ignored. Some of these problems include:

1. the lack of a sustainable freshwater lens capable of supporting the biome,
2. the lack of explanation for the timing of the lycopod coal beds, as most occur only in Upper Carboniferous or Pennsylvanian layers,
3. the lack of an explanation for the deposition of three complete megasequences (over 3 km thick) in North America prior to the deposition of lycopod coal beds, and
4. the lack of any evidence of a floating-forest biome in strata deposited prior to the complete closing of the proto-Atlantic Ocean.⁶

And the entire point of my most recent *J. Creation* article concerns the vastness of Cenozoic coal beds that are thicker and more extensive globally than the lycopod coals (Pennsylvanian System).⁷ Cenozoic coals are not composed of lycopod trees. The floating forest model cannot explain them. As I concluded in my article:

“To make matters worse, the advocates of the floating forest hypothesis have made no attempt to account for the thickest and most extensive coals in the world. Coals found in Cretaceous and Paleogene rocks globally have been largely ignored. Creation scientists should not dogmatically hold on to a hypothesis that cannot adequately explain even the smallest subset of coal deposits, let alone later and thicker coal beds. An acceptable Flood-based coal model should provide an explanation for *all* coals.”⁷

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References

1. Snelling, A.A. *Earth’s Catastrophic Past: Geology, Creation and the Flood*, Institute for Creation Research, Dallas, TX, p. 448, 2009.
2. Vail, P.R. and Mitchum Jr, R.M., Global cycles of relative changes of sea level from seismic stratigraphy, *Amer. Assoc. of Petroleum Geologists Memoir* 29:469–472, 1979.
3. Clarey, T., Fountains of the deep, *Acts & Facts* 43(12), icr.org/article/fountains-deep, 28 November 2014.
4. Clarey, T., Dinosaur fossils in late-Flood rocks, *Acts & Facts* 44(2), icr.org/article/dinosaur-fossils-late-flood-rocks, 30 January 2015.
5. Clarey, T.L. and Tomkins, J.P., An investigation into an *in situ* lycopod forest site and structural anatomy invalidates the floating-forest hypothesis, *CRSQ* 53(2):110–122, 2016.
6. Clarey, T.L., Examining the floating forest hypothesis: a geological perspective, *J. Creation* 29(3):50–55, 2015.
7. Clarey, T.L., Floating forest hypothesis fails to explain later and larger coal beds, *J. Creation* 31(3):12–14, 2017.

The poor design claim of the human birth canal examined

Jerry Bergman

A common claim of evolutionists is that the human birth canal is poorly designed. As humans supposedly evolved a larger brain from an ape common ancestor, this created birthing problems in females as they did not concurrently evolve a wider pelvis to accommodate the larger brain. However, this poor design claim is either exaggerated or incorrect.

The poor design claim is a favourite ploy of Darwinists to argue against the Intelligent Design view that humans were uniquely created in God's image. One of the most common examples is the alleged problem that childbirth presents for humans. The claim is made that the birth mechanism was functional in our evolutionary ancestors, but the comparatively rapid enlargement of the brain as humans evolved has created problems today. The reason is the human birth canal diameter did not correspondingly evolve to become larger to accommodate the evolution of a larger brain. As one writer exclaimed, the greatest design flaw, which was listed first of the 10 he selected, was that the

"... pelvis in the human female is an example of perfectly decent mammalian design rendered problematic by evolution ... on account of our wonderfully large brains, human babies have huge heads, which compounds the problem of the tilted pelvis."¹

Abby Hafer, who has an Oxford Zoology Ph.D. and trains nurses, viewed this argument against creationism of such importance that she devoted an entire chapter to the poor design of the human birth canal in her latest book.² She argued it was bad design because the baby grows in size so that when the nine-month gestation has passed its "head has to fit through a circle of bone that is smaller than the head".³

She concluded that: "One would think that a benevolent Creator would not make childbirth into such a problem in the first place ... if only we *had* been designed rather than evolved [emphasis in original]." She added that this strongly supports her view that humans "evolved rather than being designed", a claim she makes without documenting the alleged childbirth problem with data on the problem's frequency.⁴

Professor Hafer is not alone in making this claim. For example, one website article, titled "Top 10 design flaws in the human body: from our knees to our eyeballs, our bodies are full of hack solutions", listed number three as:

"A too-narrow pelvis. Problem: Childbirth hurts.

And ... the width of a woman's pelvis hasn't changed for some 200,000 years, keeping our brains from growing larger. Fix: Stretch out the pelvis ... but technologists may already be onto a better solution. ... in 1,000 years, no woman in the developed world will deliver naturally. A clinic will combine the sperm and egg, and you'll come by and pick up the kid."⁵

This suggestion is very naive to say the least. This approach prevents the mother from breastfeeding her child. Baby formula cannot mimic the immune advantage because it is not human breast milk, which is specifically designed for the baby. Another problem is proper immune interaction between mother and baby depends on both foetal microchimerism and the immune modulating activities of the placenta. This interaction facilitates both a healthier child and better health as an adult.⁶ Additionally, the advantages to a baby being born vaginally include having the required gut bacteria for proper metabolic health. Evidence for this includes that caesarian-born babies more often experience metabolic issues later on, including higher rates of obesity and diabetes.

Surrogate mothers hired to grow babies for others produce a risk of exposure from previous pregnancies that could create an increased risk of autoimmune complications in the baby she produces. Last, it is best for mothers and babies to be intimately related through a 9-month gestation.

Another website article titled "The most unfortunate design flaws in the human body" is by George Dvorsky, an avid transhumanist, meaning human-directed evolution of humans using biotechnology, and promoter of the Rights of Non-Human Persons Program. He listed 10 examples of poor design in humans, concluding, "Sometimes evolution is stupid, and the human body is proof. Here are the most problematic physical and behavioral 'scars of evolution' we humans have to deal with." The poor design of the female pelvis he lists as number seven, which he titles "The extremely narrow human birth canal".⁷

The implications are, if "we claim that organisms and their parts have been specifically designed by God, we have

to account for the incompetent design of the human ... birth canal”.⁸ Hafer defended this common poor design claim based on the idea that humans and chimps have a common ancestor. As a result, she argues, the human head at birth is often too large to pass through the birth canal opening. Consequently, she concludes, the size problem causes major birth problems for humans. In short, as biology professor Nathan Lents wrote: “the size of the female pelvis limits how large the fetus’s head can grow while in utero. If it grows too large, there is no way to get out, and both baby and mother can perish.”⁹

This claim prompts the question “why evolution didn’t just co-evolve a larger pelvis to solve the problem of the evolution of larger human heads”. Lentz concluded the reason is:

“... reduced birth spacing with high infant mortality is incredibly poor planning by whatever force designed our species’ reproduction system. That shouldn’t surprise us, however, because evolution doesn’t make plans. It’s random, sloppy, imprecise—and heartless.”¹⁰

Evaluation of this claim

As noted, the Darwinists argue that the fact that the birth canal in human females passes through the pelvis can be a problem, even though the

“... prenatal skull will deform to a surprising extent. However, if the baby’s head is significantly larger than the pelvic opening, the baby cannot be born naturally. Prior to the development of modern surgery (caesarean section), such a complication would lead to the death of the mother, the baby, or both.”¹¹

When evaluating the narrow pelvis claim, humans and other primates are compared, but the many contrasts between humans and chimps birthing are ignored. For example, in contrast to all other primates, humans give birth with the baby facing *toward the floor* rather than toward the mother’s face as is true of all other primates.¹² One result is only humans seek companionship for delivery. All other animals seek privacy and solitude when birthing their offspring.¹³ Monkeys can actually help pull their young out of the birth canal and toward the mother’s front. If necessary, she can even unwrap the umbilical cord from her baby’s neck. A human baby cannot easily be pulled out of the birth canal by the mother, and doing so may damage its neck and spine. Consequently, good reasons exist for her to seek companionship during delivery.

The evolutionary argument is that the human pelvis is too narrow because natural selection selected this design for the reason that it is much more efficient for bipedal walking. Thus, evolution did not favour a wider birth canal, but when humans were evolving to walk upright, it favoured the narrow design. In contrast to this claim, at least one study of 46

subjects concluded that a *broader* pelvis is “substantially more efficient for locomotion than a narrower one”.¹⁴

Also, in contrast to this common claim, Oxford-educated zoologist Clive Bromhall writes: “it is simply not true that the [human] brain grows so fast that it ‘forces’ the baby to be born before it is ready”, as is often claimed by evolutionists.¹⁵ In fact, the “vast majority of the size difference between human brains and those of other primates results from a far longer period of growth [for humans] after the baby is born.”¹⁶ Gestational length is determined by both a variety of genetic factors and in-utero effects, including the mother’s health.¹⁷

Bromhall concluded that biological research has documented that the human brain does not grow very rapidly compared to most animals. The fact is, “the human body develops at an incredibly slow rate—it takes far longer to progress from one developmental stage to the next than any other primate”.¹⁸ Bromhall concludes that a chimpanzee’s brain nearly doubles in size between birth and adulthood, whereas the human brain *quadruples* in size and does not stop growing until around age 20. He then argues that humans have *fewer* birthing problems due to the brain size and birth canal ratio issue than do many primates.¹⁹

The author then gives several examples, such as squirrel monkeys who must actively help with their own birth.²⁰ Trevatan includes an entire section of her book on great apes’ birth traits, noting that they can have some of the same problems as humans even though their offspring have much smaller brains, thus heads, and a comparatively wider pelvis.²¹ Actually, the human baby’s shoulders can create more problems than the skull, even tearing of the perineum “if the shoulders emerge too quickly”.²² So much for the claims of Darwinists.

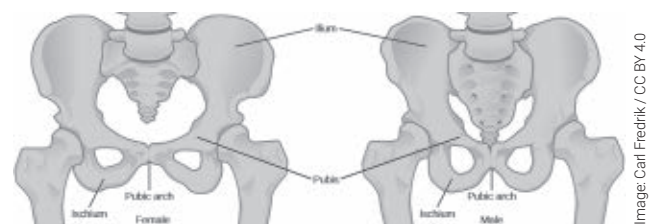


Figure 1. Comparison of male and female pelvis girdle. The white circle inside shows how much wider the female is to facilitate childbirth.

The female pelvis reflects an optimized design for childbirth and upright walking

The female pelvis, Latin meaning ‘basin’, is a bone cradle that holds and even allows the baby to rock while it is developing in the uterus. The pelvis consists of two large hip bones that form the sides of the cradle and meet at the front of the body connected together by the symphysis

pubis. The symphysis pubis is a fibrous joint composed of dense connective tissue. During pregnancy, a hormone called *relaxin* causes this joint to become more flexible allowing the birth canal opening to significantly increase in size to permit the birth of the baby in a healthy mother with very few complications.²³

The skull of the newborn is also fairly flexible and, in almost all cases, able to conform to the birth canal opening. An infant's skull is made up of six separate cranial bones held together by strong, fibrous, elastic sutures. The spaces between the bones, called fontanelles, remain open in babies for some time, and are a normal part of child development.

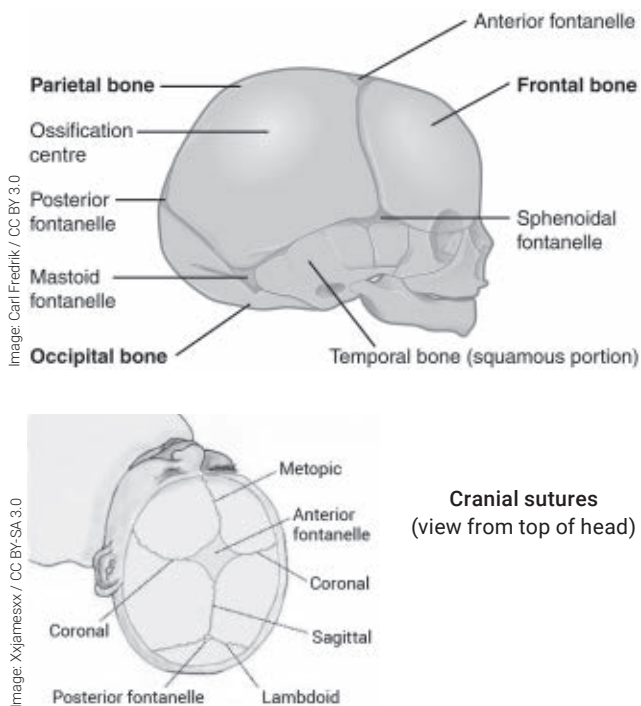


Figure 2. The spaces between the bones, the fontanelles, allow a fair amount of infant cranium flexibility during birth.

The flexibility of the sutures allows the bones to move so the baby's head can pass through the birth canal without pressing on, and damaging, the brain. During infancy and childhood, the sutures and fontanelles remain flexible to allow the child's brain the ability to develop properly and still protect the brain from minor impacts. The posterior fontanelle closes by 1 or 2 months after birth, and the anterior fontanelle closes between 9 and 18 months later.

The placenta

The placenta is the primary endocrine organ maintaining pregnancy and causing the birth process.²⁴ This includes

producing hormones that loosen the ligaments between the sacroiliac joints located between the sacrum and each iliac bone, the two bones forming the hips, causing a slight separation of the joints. This allows the flexibility required for the baby's head to pass through the birth canal during birth. As one observer, who was involved in helping hundreds of mothers to deliver their children, noted, the pelvis "is amazingly designed for its functions, especially for giving birth".²⁵ Birthing problems may sometimes be a result of the mother's normal anxiety about the birth process, not the physical design of the birthing system.²⁶ The fact is "delivering a baby is exactly what your body is designed to do—and it will do so instinctively".²⁷

Another hormone that is important in birth is progesterone. As the placenta forms and grows, its trophoblasts convert the cholesterol it removes from the mother's bloodstream into progesterone. Progesterone has many functions during mid-to-late pregnancy, including preventing the muscles of the womb from contracting *until* the onset of labour. It then strengthens the muscles of the pelvic wall in preparation for labour. This function is critically important in order to produce the strength needed to successfully birth the baby.²⁸ The "uterus is the largest muscle in the human female body, exerting an average of 30 pounds [14 kg] of force during contractions of labor. When a woman begins to push with contractions of the second stage, her efforts can double that pressure..."²⁹

Reflecting normal anatomical variety, the pelvis may be a different shape from the optimal design called the gynaecoid pelvis. This is where the pelvic brim is close to a circle instead of an oval, such as the android (thin) or platypelloid (flat) shape. Even in nearly all such cases, delivery occurs without major problems. One problem, which is actually rare, is when a very petite woman gives birth to a very large child.³⁰

When a baby is so large that it cannot fit through the pelvis, called macrosomia, this condition is called cephalopelvic disproportion (or CPD for short). According to the American Pregnancy Association, true cases of cephalopelvic disproportion are very rare today.³¹ The American College of Obstetricians and Gynecologists' 662-page guide to pregnancy mentions this problem only once, specifically in reference to one of the 10 reasons for a cesarean section.³²

Childbirth problem data

Childbirth problems are now very rare in the Western world. In the United States, for every 100,000 babies born to white mothers only 8.4 mothers died, and for African Americans close to 32 mothers died.³³ Compared to all other countries in the Western world the United States has among

the highest maternal death rates from any cause. In the US, an estimated 14 infant deaths per every 100,000 live births occurred in 2015. Greece, Iceland, Poland, and Finland are tied for the lowest rate; only three deaths per 100,000 live births in 2015.³⁴ And the percentage of these deaths due to delivery problems is a small fraction of this number. Major contributing factors include poor nutrition, sexually transmitted disease, general poor health of the mother, and delivery in unsanitary conditions.³⁵

True cases of when a baby cannot properly fit through the pelvis due to cephalopelvic disproportion are actually very rare.³⁶ The majority of cephalopelvic disproportion cases are due to accidents, such as a pelvic fracture from a sports or traffic accident, or birth defects that damage the pelvis, poor nutrition that results in rickets, illnesses such as polio that lead to pelvic anomalies, and hormone deficiencies such as abnormally low levels of oxytocin.

The synthesis of oxytocin, the first biologically active polypeptide to be synthesized in a laboratory, was achieved in 1953. Its many functions include the stimulus of uterine contractions by strengthening the strong muscular contractions that function to expel the fetus during childbirth.³⁷ Appropriately, the term oxytocin means ‘swift childbirth’.

At the start of labour the number of oxytocin receptors also reaches its maximum which ensures the uterus effectively responds to the hormone. Birthing problems may result if the level of oxytocin, or the number of receptors, is comparatively low. Once contractions begin, the muscles push on receptors in the pelvis that release more oxytocin, which again pushes harder on the receptors in order to release even more oxytocin. The wave of contractions continues after childbirth to cause the uterus to expel the placenta.

Failure to progress

Many mothers whose labour process is labelled ‘failure to progress’ may be incorrectly given a diagnosis of cephalopelvic disproportion. As noted, the most common causes today of cephalopelvic disproportion are major congenital abnormalities or severe injuries. In the past, due to illnesses such as rickets and polio, pelvic anomalies causing the birthing problems noted above were far more common than today.³⁸ However, when this issue can be confirmed as the reason for a delivery problem, the recommended safest delivery protocol is a caesarean section.³⁹

One study of caesarean sections, including a meta-analysis in addition to an analysis of new data, found some caesarean sections are unnecessary and may increase the risk of a wide variety of health problems both for the mother and the child.⁴⁰ The report added the fact that the rate of caesarean sections greatly varies across providers, facilities, and states, which

indicates this approach may not always be the best solution. Caesarean sections also vary enormously in developed nations, from 333 per 1,000 births in Italy to 170 per 1,000 births in the United Kingdom.⁴¹

As our nutrition, prevention of rickets, and lifestyle have improved, pelvic anomalies have become very rare, and vaccinations have largely eliminated polio.⁴² The leading obstetrics and gynaecology textbook for over 40 years notes that the diagnosis of cephalopelvic disproportion occurs in as few as 1 in 205 pregnancies, and most of these cases result from problems related to insufficient labour, inadequate levels of oxytocin and other reasons, and “not problems with large fetal size or a small maternal pelvis”.⁴³

Last, the average height of the adult American male is 5 feet 10 inches (177.8 cm) with a standard deviation of 2.9 inches (7.4 cm), meaning 70% of American males are between 5 feet 7 inches to about 6 feet 1 inch (170.4 to 185.2 cm). For adult females, the arithmetic mean height is 5 feet 5 inches (165.1 cm), with a standard deviation of 2.7 inches, meaning that 70% are between 5 feet 2.3 inches to about 5 feet 7.7 inches (158.2 to 172 cm). Consequently, the reasonable extremes for a tall male of 6 feet (183 cm) and a short female of about 5 feet 2.3 inches (158.2 cm) results in less than 1 foot (24.8 cm) in height difference.⁴⁴

Conclusion

Evolution theory has postulated that as humans evolved our brain became larger, but female hips did not correspondingly increase in size due to selection favouring bipedal locomotion, causing major birthing problems. Darwinists often imply that the female pelvis is too small for a large baby, a problem in a large number of deliveries today, when this problem is, in fact, very rare. Even women whose pelvic shapes deviate from the ideal, regularly have successful vaginal deliveries.

Furthermore, the female pelvis is designed to effectively serve several very different functions, including stable support for internal organs. The existing design allows for both effective bipedal walking that requires the hips to be a certain shape, as well as for effective delivery of a baby when it is sufficiently developed. Its design must accommodate all of these very diverse requirements. To accomplish this requires a very complex system, involving many different hormones, nerves, muscles, and bones, all working together harmoniously to achieve childbirth.

Conversely, the mutational load that has accumulated in humans in the past 6,000 years since creation may have had some adverse effects on childbirth, causing the data to imperfectly reflect the original design which God declared “very good”. This reminds one of Genesis 3:16, where God said to the woman, as a result of sin, “I will surely multiply

your pain in childbearing; in pain you shall bring forth children.”⁴⁵

Clearly, unbiased scientific study reveals that both the bodily structure and functionality of the human mother and baby birthing process, and the ingenious design features which are part of this system, reflect an omnipotent Creator. Almost all problems that occur due to the size of the female pelvis are not due to design problems, but are largely health and injury related. Once again, science research supports the Scriptures, and not the failed speculations of evolutionists.

Acknowledgements

Thanks to Loren Wanner, M.D., Obstetrician-Gynaecologist; Jeff Tompkins, PhD; Randy Guliuzza, M.D., and MaryAnn Stuart, M.S., for their help on this paper.

References

- Natalie, A., *Women: An intimate geography*, Houghton Mifflin, Boston, MA, p. 308, 1999.
- Hafer, A., Bad design—the birth canal; in: *The Not-So-Intelligent Designer: Why evolution explains the human body and intelligent design does not*, Cascade Books, Eugene, OR, chap. 11, pp. 45–52, 2016.
- Hafer, ref. 2, p. 45.
- Hafer, ref. 2, pp. 46–47.
- Rowe, C., Top 10 design flaws in the human body: from our knees to our eyeballs, our bodies are full of hack solutions, nautil.us/issue/24/error/top-10-design-flaws-in-the-human-body, 12 May 2015.
- Arck, P. and Hecher, K., Feto-maternal immune cross-talk and its consequences for maternal and offspring's health, *Nature Medicine* 19(5), May 2013.
- Dvorsky, G., The Most Unfortunate Design Flaws in the Human Body, io9.gizmodo.com/the-most-unfortunate-design-flaws-in-the-human-body-1518242787, 2014.
- Ayala, F., *Darwin's Gift to Science and Religion*, Joseph Henry Press, Washington DC, pp. 159–160, 2007.
- Lents, N., *Human Errors: A panorama of our glitches, from pointless bones to broken genes*, Houghton Mifflin, Boston, MA, 2018.
- Lents, ref. 9, pp. 106, 110.
- Argument from poor design, en.wikipedia.org/wiki/Argument_from_poor_design.
- Trevathan, W., *Human Birth: An evolutionary perspective*, De Gruyter, New York, pp. 88–91, 1987.
- Angier, N., *Women: An intimate geography*, Houghton Mifflin, Boston, MA, p. 308, 1999.
- Vidal-Cordasco, M., Mateos, A., Zorrilla-Revilla, G., Prado-Nóvoa, O., and Rodríguez, J.M., Energy cost of walking in fossil hominins, *American J. Physical Anthropology* 164(3):609–622, 2017.
- Bromhall, C., *The Eternal Child: Staying young and the secret of human origins and behaviour*, Ebury Press, New York, p. 180, 2003.
- Bromhall, ref. 15, pp. 180–181.
- Goer, H., Romano, A., and Sakala, C., Vaginal or cesarean birth: what is at stake for women and babies? transform.childbirthconnection.org/wp-content/uploads/2013/02/Cesarean-Report.pdf, 2012.
- Bromhall, ref. 15, pp. 181–182.
- Moxon, S., Review of *The Eternal Child: An explosive new theory of human origins and behaviour* by Clive Bromhall, *Human Nature Review* 3:402–405, 2003.
- Bromhall, ref. 15, pp. 179–180.
- Trevathan, ref. 12, pp. 84–89; The amazing female pelvis designed for giving birth, pregnancy-and-giving-birth.com/female-pelvis.html.
- Trevathan, ref. 12, p. 88.
- Israel, L. and Groeber, W., Relaxin: a persistent challenge, *Obstetrics & Gynecology* 15(1):2–8, 1960.
- Trevathan, ref. 12, pp. 9–10.
- Trevathan, ref. 12, pp. 102–104.
- Beck, C.T., Birth trauma: in the eye of the beholder, *Nursing Research* 53(1):28–35, 2004; Angier, ref. 13, p. 308.
- Roizen, M. and Oz, M., *You Having A Baby*, Free Press, New York, p. 230, 2009.
- Trevathan, ref. 12, p. 67.
- Trevathan, ref. 12, p. 68.
- Preventing the first cesarean delivery: summary of a joint Eunice Kennedy Shriver National Institute of Child Health and Human Development, Society for Maternal-Fetal Medicine, and American College of Obstetricians and Gynecologists workshop, Spong, C.Y., Berghella, V., Wenstrom, K.D. et al., *Obstetrics & Gynecology* 120(5):1181–1193, 2012.
- Pyanov, M., Small pelvis? Big baby? Here's the truth about CPD, bellybelly.com.au/birth/small-pelvis-big-baby-cpd/, June 2018.
- Your Pregnancy and Childbirth*, American College of Obstetricians and Gynecologists, 6th edn, Washington, DC, p. 264, 2016.
- Norton, A., Serious birth complications rising in the US, reuters.com/article/us-birth-complications/serious-birth-complications-rising-in-the-u-s-idUSBRE89M1AL20121023, 24 October 2012.
- CIA, The World Factbook, cia.gov/library/publications/the-world-factbook/rankorder/2223rank.html, 2015.
- Trevathan, ref. 12, p. 70.
- Pyanov, ref. 31, pp. 1–3.
- Thibodeau, G. and Patton, K., *Anatomy and Physiology*, Mosby, St Louis, MO, p. 553, 2009.
- Health at a Glance 2015, OECD Indicators, read.oecd-ilibrary.org/social-issues-migration-health/health-at-a-glance-2015_health_glance-2015-en#, p. 117.
- Impey, L. and O'Herlihy, C., First delivery after cesarean delivery for strictly defined cephalopelvic disproportion, *Obstetrics & Gynecology* 92(5):799–803, 1998.
- Henic, G., Vaginal or cesarean birth: what is at stake for women and babies? *A Best Evidence Review*, 2012.
- Metcalfe, L., Health. Births by caesarean section: countries compared, nationmaster.com/country-info/stats/Health/Births-by-caesarean-section.
- Pyanov, ref. 31, pp. 1–4.
- Nygaard, I. (Ed.) *Danforth's Obstetrics and Gynecology*, 10th edn, Lippincott, Williams and Wilkins, Philadelphia, PA, pp. 435–435, 2008.
- Ludwig, D. and Currie, J., The relationship between pregnancy weight gain and birth weight: a within family comparison, *The Lancet* 376(9745):984–990, 2010.
- Genesis 3:16, English Standard Version.

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Four chronological periods

David Austin

In attempting to find an accurate and complete Old Testament chronology, resort has been made a number of times to the use of overlapping of periods, round about approximations, and different translations and/or interpretations. The four chronological periods presented here in a table show that there is no need for such resort. They also demonstrate, by their synchronization with each other, the impossibility of changing any of the biblical dates.

Chronology is important in understanding history and so we must have it as accurate as possible. Floyd Jones¹ states: “the events of history can only be meaningful and properly understood as long as they are kept in their proper time sequence”. Biblical chronology has been presented sometimes with huge gaps created by missing generations, etc. not recorded in Scripture. Jonathan Sarfati states:

“Normally, people want to push the Flood right back, and since the Genesis 11 chronologies are the ones that link the Flood to Abraham, these are the ones that must be ‘expanded’.... But since the Genesis 11 people had sons at age 35 or less, to add even 10,000 years would take over 250 missing generations.”²

Table 1 presented below will not allow this supposed ‘expansion’ gap, nor overlappings, nor textual or translation alterations, to make it fit with current archaeological expectations, because then the grand totals of the columns clearly stated in Scripture would have to be altered.

The four chronological periods below are ‘framed’ together to make one clear picture of the ‘accuracy’ of God’s mathematics. It would be quite difficult to alter even one of the biblical figures. Even the four secular figures used in column 4, I believe, will stand the test of time, and will not be out, perhaps, by more than one or two years. To some degree they are similar to a completed jigsaw where the numbers are like pieces all beautifully fitted together. If one piece of the jigsaw is out of shape it will not fit, and the jigsaw ‘picture’ remains incomplete. There is also some similarity of the tables to an algebraic equation which would not work out if one of its components, however small, were changed. I hope I am not exaggerating the importance of keeping the figures as they are.

We should especially take into account that columns 1 to 3b, and to a fair extent 4, are much supported by Scripture, as has been stated. If alterations were made to one of these numbers, (e.g. the 14 years of ‘Division and Rest to Cushan’), then the grand totals of column 1 (300 years (Judges 11:26)), column 2 (450 years (Acts 13:19–20)), column 3a (480 years (1 Kings 6:1)), and column 4 (1903 years (secular chronology)),³ *the grand totals would not agree with Scripture.*

We cannot even rely upon ‘compensating errors’, e.g. making the Rest of Ehud 60 years instead of 80, and the Rest of Othniel 60 instead of 40 years, since Scripture is clear on the number of years’ rest for both Ehud and Othniel. Not one KJV figure has needed to be altered.

So why are there ‘four’ chronological periods set alongside each other? The reason for this is to show clearly that one figure cannot be altered in one column without it being altered in another column. Each column is a ‘stay’ just like a sailing ship that requires a rope or a guy as a stay to support a mast. Each period keeps the other in place. But most importantly the four periods together assist greatly in maintaining *the accuracy of the mathematics of our God.*

Periods calculated in table 1 but not found in Scripture

14 years from the birth of Peleg to the Founding

There were 14 years from the birth of Peleg who was born in 1757 AM (*Anno Mundi*, year of the world), agreed to by Archbishop Ussher¹¹ to the Founding, i.e. the beginning of Babel, (Genesis 10:10), in 1771 AM. Ussher claims: “the founding of Babylon, about fourteen years after the birth of Peleg”.¹¹ To confirm this, note the following: If Alexander the Great captured Babylon about 330/331 BC (this date is accepted by both biblical and secular chronologists):

1. There were 1903 years from that time (see below) to the Tower of Babel,
2. It took 42/43 years from the beginning of the kingdom of Babel to build the tower (see below).

It would then only be 14 years from this beginning back to the birth of Peleg:

330/331 BC + 1903 yrs + 42/43 yrs + 14 yrs brings us to about 2289/2290 BC or 1757 AM. 1757 AM is Ussher’s and Mauro’s date for the birth of Peleg. There are about 4047 AM biblical years from Creation to the end of 1 BC (see table 1). By deducting 2290 AM years from the 4047 AM years we find a 1757 AM date.

Table 1. Four chronological periods

Period	1*	2**	3a†	3b†	4§	Reference	AM [¶] Date	BC Date
Creation to Flood 1656 yrs						Genesis 1:1–9:29	0–1656	4047–2391
To birth of Peleg 101 yrs						Genesis 10:1–10:25	1657–1757	2390–2290
‘Babel’ starts 14yrs later						<i>Annals of the World</i> ⁴	1758–1771	2289–2276
To Tower of Babel 42 yrs						<i>Book of Invasions</i> ⁵	1772–1813	2275–2234
Death of Peleg at 239 yrs.					183	Genesis 11:18–19	1814–1996	2233–2051
To birth of Abram					12	Genesis 11:20–26	1997–2008	2050–2039
Abram’s Ent. to Canaan					75	Genesis 12:4–15: 21	2009–2083	2038–1964
‘Confirmation’, Abram to law					430	Gal. 3:17; Exod. 12:40	2084–2513	1963–1534
Exodus & law to Heshbon			39		39	Numbers 21:25	2514–2552	1533–1495
Heshbon to Canaan	1		1		1	Numbers 14:30–34	2553–2553	1494–1494
War to Division of Land	6	6	6		6	Joshua 14:7–10.	2554–2559	1493–1488
Division & Rest to Cushan	14	14	14		14	Refer to article ⁷	2560–2573	1487–1474
Service under Cushan	8	8		8	8	Judges 3:8	2574–2581	1473–1466
Rest under Othniel	40	40	40		40	Judges 3:11	2582–2621	1465–1426
Service under Eglon	18	18		18	18	Judges 3:14	2622–2639	1425–1408
Rest under Ehud	80	80	80		80	Judges 3:30	2640–2719	1407–1328
Service under Jabin	20	20		20	20	Judges. 4:1–3	2720–2739	1327–1308
Rest under Barak & Deb.	40	40	40		40	Judges 5:31; Heb. 11:32	2740–2779	1307–1268
Service under Midian	7	7		7	7	Judges 6:1	2780–2786	1267–1261
Rest under Gideon	40	40	40		40	Judges 8:28	2787–2826	1260–1221
Abimelech–Usurpation	3	3		3	3	Judges 9:22	2827–2829	1220–1218
Tola’s Judgeship	23	23	23		23	Judges 10:1–2	2830–2852	1217–1195

Jair's Judgeship		22	22		22	Judges 10:3	2853–2874	1194–1173
Service under Ammon		18		18	18	Judges 10:8	2875–2892	1172–1155
Jephthah's Judgeship		6	6		6	Judges 12:7	2893–2898	1154–1149
Ibzan's Judgeship		7	7		7	Judges 12: 8–9	2899–2905	1148–1142
Elon's Judgeship		10	10		10	Judges 12:11	2906–2915	1141–1132
Abdon's Judgeship		8	8		8	Judges 12:13–14	2916–2923	1131–1124
Service under Philistines		40		40	40	Judges 13:1; 15:20	2924–2963	1123–1084
Eli's Judgeship until Samuel's 'sole' period.		40	40		40	1 Samuel 4:18	2964–3003	1083–1044
Samuel–Judge & 'Prophet' to Saul's reign			20		20	1 Samuel 7:2; Acts 3:24	3004–3023	1043–1024
Saul's reign			40		40	Acts 13:21	3024–3063	1023–984
David's reign			40		40	2 Samuel 5:4	3064–3103	983–944
Solomon's reign to 4 th yr			4		4	1 Kings 6:1	3104–3107	943–940
Rest of reign of Solomon					36	2 Chron. 9:30	3108–3143	939–904
Israel's 390 yrs to 4 th yr of Zed's reign [§]					390	Ezekiel 1:1–2; 4:4–5	3144–3533	903–514
Remainder of Zed's reign					7	2 Kings 24:18	3534–3540	513–507
Bal. of 70 yrs [From 3 rd yr of Jehoiakim, (Daniel 1:1); 3521–3540 AM = 20 yrs]					50	Daniel 1:1; Jer. 25:11–12	3541–3590	506–457
Persian Period (Refer to 'Is Darius ...?' [¶])					126	Daniel 9:25 (see footnote)	3591–3716	456–331
Alexander the Great (330/331 BC) ¹⁰						Daniel 11:3	3717–4047	330–end of 1
Grand Totals	300	450	480	114	1903			

* 300 years that "Israel dwelt in Heshbon and her towns, and in Aroer and her towns, and in all the cities that be along by the coasts of Arnon, three hundred years ..." (Judges 11:26).

** 450 years from the commencement of war after the children entered Canaan to the time of the last of the 'specially commissioned judges', i.e. Eli—Acts 13:19–20 (KJV).

† 480 years of Theocracy (God's rule over His People) from the Exodus to the 4th year of King Solomon when he began to build the house of the Lord (1 Kings 6:1).

‡ 114 years of six servitudes and one usurpation (Abimelech) when God gave over the rule of His people to their enemies. There were exactly 594 'biblical' years in the period referred to from the Exodus to the 4th year of Solomon's reign, (480 years of Theocracy + 114 years of Servitude and Usurpation).

§ 1903 secular and biblical years from the time of the Tower of Babel (Genesis 11:1–9) to the capture of Babylon by Alexander the Great in 330/331 BC.

¶ AM = Anno Mundi, which means 'year of the world'.

The Tower of Babel was built in 42/43 years

The ‘Dispersion’ did not occur at the time of the beginning of the kingdom of Babel but about 42/43 years after the tower of Babel was built. This likely scenario, as implied in the *Irish Book of Invasions*¹² where it states: “At the end of forty two years after the building of the Tower, Ninus, son of Belus took the kingship of the world” is that after the founding, i.e. the beginning of the kingdom (Genesis 10:10), the building of the Tower commenced which took 42 years. At the end of that time Nimus (Nimrod) “took the kingship of the world”. *The Book of Jubilees*,¹³ which contains one of the most detailed accounts found anywhere of the Tower, states: “and they began to build, and in the fourth week they made brick with fire And they built it: forty and three years were they building it.”

1903 years of column 4

It is more than interesting to note that from the time when the ‘Tower of Babel happened’ in 2233/2234 BC (according to the tables) there is exactly 1777 ‘biblical’ years from this time to the end of the 70 years’ captivity, i.e. the year when Belshazzar was slain (Daniel 5:30–31; Jeremiah 25:12) and 126 ‘secular’ years from when Belshazzar was slain to the end of the Persian Period when Alexander the Great captured Babylon in 330/331 BC, i.e. $1777 + 126 = 1903$ years.

Concerning the length of the Persian Period (126 years), it is conceded that secular history normally gives us about 206/207 years for that particular time. However, a number of reasons are given in a recent article,¹⁴ showing why the Persian Period should be reduced to about 126 years. One of the main reasons why this should be so is because the Scriptures give us only 483 years (69×7 weeks) from the time of the giving of the commandment (Daniel 9:25), to Christ’s baptism in 26/27 AD, not $206 + 330 + 27$ years = 563 years. The Persian Period commenced immediately after the completion of the 70 years of Babylonian captivity. (Jeremiah 25:11–12; 29:10). Philip Mauro¹⁵ considers that *two years after* Cyrus and Darius the Mede began their rule (Daniel 5:28) “*This year marks the end of the 70 years’ captivity*”. But Jeremiah 25:12 tells us that the King of Babylon (Belshazzar reigning for King Nabonidus) shall be punished “when seventy years are accomplished”. Another reason why the 490 years commenced immediately after the completion of the 70 years’ captivity is found in Daniel 9:19 (“*O Lord, hear; O Lord, forgive; O Lord hearken and do; defer not.*” *God did not procrastinate for 80–82 years.* What did Daniel pray for?

- “O Lord ... let thine anger and thy fury be turned away from *Thy city Jerusalem*” (Daniel 9:16)
- “Cause Thy face to shine upon Thy *sanctuary*” (Daniel 9:17)

Table 2. Seventeen different Hebrew words for ‘about’ in the Old Testament

Reference nos (James Strong)	Scripture	Meaning of ‘about’
#5921	Gen. 41:42	Upon, over, above
#5437	Ex. 13:18	Surround, circle
#854	Ex. 19:23	Nearness
#7751	Num. 11:8	Travel
#6213	Deut. 31:21	Do or make
#5362	Josh. 6:11	Surround, circulate
#3803	Judg. 20:43	Enclose
#4524	1 Kings 6:29	Compass about
#413	2 Kings 8:21	Near, with, among, motion towards
#5048	Neh. 13:21	Over against or before
#1157	Job 1:10	About, at, in, up to, or over against
#5440	Job 8:17	Entwine
#247	Job 30:18	Bind about, gird up
#1980	Prov. 20:19	Walk about
#235	Jer. 2:36	Gad about, go to and fro
#5503	Jer. 14:18	Travel around
#2559	Jer. 31:22	Withdraw, depart, enwrap

- “Behold our *desolations* (i.e. the things that were destroyed, made waste. This would include the wall)” (Daniel 9:18).

Do we believe God answered all of Daniel’s prayer immediately and against ‘procrastination’, or do we think that only part of the prayer was answered and the children of Israel had to wait 80–82 more years before the rest of the prayer was answered?

The 483 years of Daniel 9:25 (69×7 weeks) is made up this way: 126 years (Persian Period), + 330/331 years (Alexander the Great’s capture of Babylon to 1 BC), 26/27 years to Christ’s baptism when He was about 30 (Luke 3:23). $126 + 330 + 27 = 483$ years. (Christ was born about 4 BC).

The Babylonians are known for their accuracy in mathematics, etc. So is the Lord God Almighty. So, until otherwise shown, this writer accepts the 1903 years as being ‘very close to the mark’.

Archbishop Ussher¹⁶ states: “*The Tower of Babel happened ... Nineteen hundred and three years elapsed from this time to the capture of Babylon by Alexander the Great.*”

The changing of numbers

If, for example, we change the number of rest years of Ehud in Column 1 to 40 years—even though the KJV, the NIV, and the Gideon’s Bible all clearly state 80 years (Judges 3:15–30)—this means we have to change the grand total of 300 years in Column 1 and the 80 years in Columns 2, 3a, and 4, as well as their grand totals. What a ‘mess’ we would then be in!!! *We cannot even allow for compensating errors, e.g. rest under Ehud be 60 years in length instead of 80 years, and Gideon’s rest be 60 years in length instead of 40 years. This would mean four changes to the ‘80’ figure of Ehud’s and four changes to the ‘40’ figure of Gideon’s, 8 changes altogether and 8 changes to the scriptural references.*

The inevitable historical induction

In the tables there is reference to 14 years from the end of ‘The Six Years’ War’ through the division of the land and rest period to the commencement of servitude under Cushan. Please note carefully that the shorter periods in Column 2 and 3a, except this 14-year period, are all supported by Scripture, and require 14 years to make agree the shorter periods to the grand totals of these columns, which are also supported by Scripture. Philip Mauro¹⁷ shows that in the 300-year period when Israel occupied Heshbon there were 286 years recorded in Scripture re the period mentioned above, so by an inevitable historical induction we must conclude that the remaining years would be 14. When the ‘inevitable historical induction’ method is not used we get various results as seen below:¹⁸

Eusebius, a recognized historian, has ‘four gos at it’. I cannot accept that the figure ‘14’ fits exactly into 4 different columns by mere coincidence or juggling of theories.

The Hebrew use of the word ‘about’

In the Hebrew of the Old Testament there is no use of the word ‘about’ in the sense of ‘roughly’, ‘approximately’, ‘nearly’, or ‘estimating’ when it comes to numbers. Even synonyms or phrases of synonymy to ‘about’, such as ‘near enough’, ‘around’, ‘thereabouts’, ‘more or less’, ‘at a guess’, are decidedly missing. In the Old Testament there were found 17 different Hebrew words for ‘about’ (see table 2). None of them have a ‘round-about’, approximate meaning. Even when we come across the use of the word ‘about’ in our English translation (“And Darius the Median took the kingdom, being about threescore and two years old” (Daniel 5:31)), and we would normally take the sense to mean ‘approximately’, we also discover that there is no Hebrew word at all for this ‘about’ in the original.

Too many overlappings

Attempts have been made, in order to justify certain given chronological convictions, tables, systems, etc. to resort to too many ‘overlappings’ of certain chronological periods of the Old Testament. A classic example is found in Ussher’s ‘Annals of the World’¹⁹. Here, there is an endeavour to reduce the chronological time, starting at the end of the servitude of Eglon, king of Moab (Ussher’s date is AM 2679d) and the beginning of the ‘rest’ period under Ehud starting at the same date (AM 2679d). The ending date, that is the death of Ehud, Ussher has as AM 2699d. Ussher has reduced the time from 80 years to 20, even though the KJV, the NIV, and the Gideon’s Bible all say that the period of Ehud’s rest was 80 years.

Other problems solved by the table

Abraham was born when Terah was 130 years of age

Abraham was not born at the age of 70 (Genesis 11:26) and was the first born of the three mentioned, any more than Shem was the eldest of Noah’s three sons just because he was mentioned first in Genesis 9:18 (“And the sons of Noah, that went forth of the Ark, were Shem, and Ham, and Japheth”). As a matter of fact Ham is called the youngest in Genesis 9:24, as Jonathan Sarfati agrees.²⁰ Sarfati on

THE JOSHUA-JUDGES CHASM.					
From the Division of the Land to the Oppression of Cushan, according to the subjective opinions or guesses of Chronologers Ancient and Modern.					
	..	..	..	..	YEARS.
Willis J. Beecher	..	..	..	..	11
Petavius	..	..	..	..	18
Du Fresnoy	..	..	..	..	19
Clinton	..	..	..	..	20
Sulpicius Severus	..	..	..	..	20
Paschal Chronicle	..	..	..	..	20
Clement of Alexandria	..	..	..	..	20
Theophilus	..	..	..	..	20
Eusebius	..	..	..	20 or 23 or 48 or 50	50
Hales	..	..	..	..	29
Blair	..	..	..	..	31
Ussher	..	..	..	..	31
Henry Browne	..	..	..	..	36
Des Vignoles	..	..	..	..	36
Josephus	..	..	..	..	36
Syncellus	..	..	..	..	38
A.V. Margin—Bp. Lloyd (B.C. 1444–1402)	..	..	..	..	42
Africanus	..	..	..	..	48
Pezron	..	..	..	..	61
Serrarius	..	..	..	..	71

Genesis 10:21²¹ (“Unto Shem also, the father of all the children of Eber, the brother of Japheth the elder”) also states: “Thus 10:21 should be translated ‘Shem, whose older brother was Japheth’.” The ‘natural reading’ of Genesis 11:32–12:4 (KJV and NIV) would agree with what has been said before. Now here is what is interesting re the time of Abraham’s birth when Terah was 130 years. If Abraham was born when Terah was 70, then it throws out the 1903 years by 60 years. The birth of Abram in 2008 AM, instead of it being 12 years after the death of Peleg in 1996 AM (1757 + 239 = 1996), would be 48 years before the birth of Peleg.

Mauro²² states:

“As in the parallel case of the sons of Noah, where Shem is named first, not because he is the oldest son, but because he is the one through whom God’s purpose was to be accomplished, so of the sons of Terah, Abram is first mentioned, though not the oldest son.”

The 430 years of Exodus 12:40

There were 215 years from the ‘Confirmation’ (Galatians 3:17) of the covenant (Genesis 15:8) when Abraham was 75 to the time when Jacob went down into Egypt, and 215 years in Egypt.²³ Column 4 shows Abraham entering Canaan in AM 2084 and Sinai occurring in AM 2513.

Conclusion

The four chronological periods presented here shows there is no need for the use of overlapping of periods, roundabout approximations, and different translations and/or interpretations, to create a complete chronology of the Old Testament.

In preparing this article, I found that God never makes a mistake with his mathematics. I understand that the Scriptures were written by about 40 different writers over a period of approximately 1,600 years. In this fact we find further evidence that because there was no ‘human error’ found in the chronological figures of the tables (and there were plenty of figures), we conclude the numbers were ‘God breathed’.

As there are only about 4,046/4,047 ‘young earth’ years that can be found in Old Testament chronology from the creation of the universe to the end of 1 BC, it would be impossible to come across, for example, about 700,000 years for the age of Peking Man.

The earth is supposed to have existed, according to some secular chronologists, for up to 4.5 million years. To counter this assumption please read the article “Age of the earth—101 evidences for a young age of the earth and universe”.²⁴

I humbly ask any reader to indicate where any figure in this article is wrong by more than one or two years.

References

1. Jones, F., *Chronology of the Old Testament*, King’s Word Press, The Woodlands, TX, p.1, 1993–1999.
2. Sarfati, J., Biblical chronogenealogies, *J. Creation* 17(3):14–18, 2003; p. 15.
3. Ussher, J., *Annals of the World*, Master Books, Green Forest, AR, p. 22, par. 49–50, and p. 236, par. 1891, 2003.
4. Ussher, ref. 3, p.236, par. 891.
5. *The Book of Invasions* (Lebor Gabala Erenn), Biblical history, para. 13, states: “At the end of forty two years after the building of the Tower, Ninus son of Belus took the kingship of the world.”
6. Mauro, Philip, *The Wonders of Bible Chronology*, Gam Printers, Sterling, VA, p. 20, and Genesis 11:18–19.
7. Austin, D., Three chronological periods of the Old Testament, *J. Creation* 22(3):51–58, 2008.
8. Austin, D., Synchronisation of the divided kingdoms of Judah and Israel, *J. Creation* 25(2):67–73, 2011.
9. ⁹ Austin, D., Is Darius, the king of Ezra 6:14–15, the same king as the Artaxerxes of Ezra 7:1? *J. Creation* 22(2):46–52, 2008.
10. Ussher, ref. 3, pp. 243–244.
11. Ussher, ref. 3, p. 236, par. 1891.
12. Lebor Gabala Erenn, part 1, par. 13, maryjones.us/ctexts/lebor1.html
13. *The Book of Jubilees*, en.wikipedia.org/wiki/Tower
14. Austin, D., Is Darius, the king of Ezra 6:14–15, the same king as the Artaxerxes of Ezra 7:1? *J. Creation* 22(2):46–52, 2008
15. Mauro, ref. 6, p. 82.
16. Ussher, ref. 3, p. 22, par. 49–50.
17. Mauro, ref. 6, pp. 38–39.
18. Anstey, M., *The Romance of Bible Chronology*, Marshall Bros., London, New York, p.138, 1913.
19. Ussher, ref. 3, p. 53, par. 346–350.
20. Sarfati J., *The Genesis Account*, Creation Book Publishers, Powder Springs, GA, p. 678, 2015.
21. Sarfati, ref. 20, p. 678.
22. Mauro, ref. 6, p. 20.
23. Austin, D., Chronology of the 430 years of Exodus 12:40, *J. Creation* 21(1):67–68, 2007.
24. Batten, D., Age of the earth—101 evidences for a young age of the earth and universe, creation.com/age-of-the-earth.

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Flood processes into the late Cenozoic: part 6—climatic and other evidence

Michael J. Oard

This paper summarizes five more Cenozoic factors best explained by the Flood. These are: warm-climate plants and animals at mid and high latitudes, tremendous volcanism, many meteorite or comet impacts, accelerated radiometric decay, and the geology of the Middle East.

In previous parts I have explained how many geological phenomena from the Cenozoic were much better explained in terms of Flood processes rather than post-Flood catastrophism.^{1–5} These include numerous aspects from a wide range of geological considerations: seven sedimentary rock features, eight organic factors, five tectonic factors, and eight geomorphological factors. This paper explores three climatic factors: warm-climate fossils found at mid and high latitudes, the climate effects of volcanic eruptions, and the climatic effects of meteorite impacts. Then I will briefly expound on two miscellaneous considerations that favour explanation by Flood processes: the problem of Cenozoic accelerated radiometric decay and the Cenozoic geology of the Middle East. That makes a total of 33 general features of the Cenozoic best explained by Noah's Flood, indicating a Flood/post-Flood boundary in the late Cenozoic (i.e. the Miocene, Pliocene, and Pleistocene series), most often the very late Cenozoic.

Cenozoic warm climate fossils at mid and high latitudes

There are abundant plant and animal fossils in the Cenozoic that indicate a warm climate at the mid and high latitudes of both hemispheres.^{6–8} This presents a radical contrast with the climate in those regions today. The early Cenozoic is supposed to have been very warm, even subtropical, at high latitudes. The late Cenozoic is claimed to be a period of gradual cooling (figure 1), although the temperatures are still significantly warmer than today.^{9–14} Sometimes, a mix of paleoflora from different climates or environments is found.

Worldwide trend

Many sites in central Siberia have plant and pollen fossils that indicate a past mild climate.^{15,16} In lower Cenozoic strata, palms and mangroves are among the tropical fossils found in

southern England.¹⁷ Palms and swamp cypress are found on the island of Spitsbergen in the Svalbard archipelago, north of Norway at 80°N.¹⁸ Petrified palm fruits have been discovered in north-western Greenland.¹⁹ Tropical and subtropical plant and animal fossils, such as palms and crocodiles, are found in the Green River Formation (early Cenozoic) in the central Rocky Mountain basins.²⁰ This formation is far from the ocean and straddles the continental divide near 2,400 m altitude in south-west Wyoming. Early Cenozoic crocodiles, large tortoises that cannot hibernate, tree ferns, and palm fossils are found not only in Wyoming, but also farther north in Montana.^{21–23}

Fossil plants from warm Cenozoic climates are abundant in Alaska. Paleobotanist Jack Wolfe has documented palms, swamp cypress, mangroves, climbing vines, and other plants that would be found today in a warm, if not tropical, climate.²⁴ Swamp cypress is common today in swamps of the south-east US (figure 2). Wolfe has found similar vegetation in British Columbia and Siberia.

The north-west United States is well known for numerous Cenozoic paleoflora sites. Palm leaves and cycads from a warm climate are sometimes found, for example in the early Cenozoic Chuckanut Formation south of Bellingham, Washington (figure 3). Some of the 130 species of plants found in thin shale at Clarkia, Idaho, come from a warm-temperate to subtropical climate, such as the avocado, magnolia, and sycamore.²⁵ Warm climate fossils are common in the John Day area of north-central Oregon.

One of the most difficult plant fossil sites for uniformitarian scientists to explain is that of unfossilized, mummified 'forests' and leaf litters in the Geodetic Hills on Axel Heiberg Island. This discovery is located at 80°N latitude in the Queen Elizabeth Islands of Canada and dated early Cenozoic.²⁶ Contrary to the present climate, the trees, leaves, cones, and fruits found in the deposits of the Geodetic Hills indicate a much warmer, wetter climate. Tree rings in the stumps are unusually thick, typically 3–10 mm,

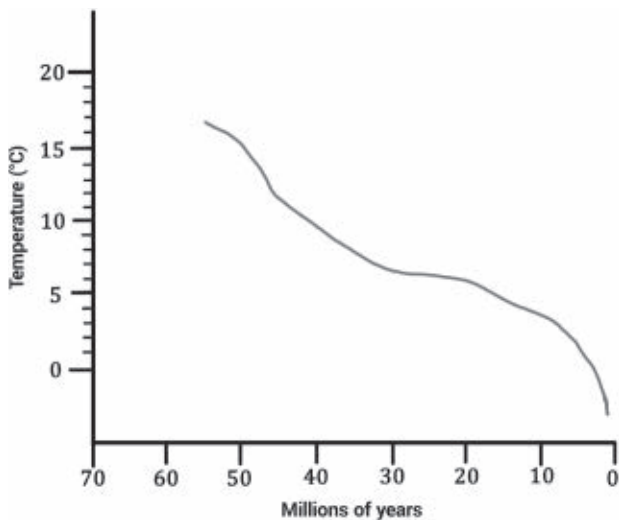


Figure 1. Inferred Tertiary cooling curve for the bottom of the ocean off Antarctica based on oxygen isotopes of benthic foraminifera from Deep Sea Drilling Project sites 277, 279, and 281 (drawn by Melanie Richard and Emily Moes)



Figure 2. Swamp cypress forest from a lake in central Mississippi, US (USDA, Wikimedia Commons PD USDA NRCS)



Figure 3. Palm fossil from the early Cenozoic Chuckanut Formation south of Bellingham, Washington, US

Table 1. Summary of Cenozoic climatic and miscellaneous evidences best explained by Flood processes. The assessed strength is based on the difficulty of explaining these features according to post-Flood processes.

Climatic and miscellaneous evidences	Strength
1. Warm climate fossils at mid and high latitudes	Strong
2. Volcanic winter	Strong
3. Impact winter	Strong
4. Radioactive decay	Strong
5. Ultrahigh-pressure minerals	Strong

and show little or no indication of growth stress.²⁷ Early Cenozoic vertebrate fossils have been found near the plant sites on west-central Ellesmere Island, also indicating a warm climate. Flying lemurs uncovered here are of particular note because they need a constant supply of seeds and fruits in the trees, indicating temperatures above freezing *year round*. The animals, like the trees, suggest a warm, possibly even subtropical climate with little seasonal contrast.^{28–30}

Scientists have been able to quantify aspects of the early Cenozoic climate on Axel Heiberg Island. During the Eocene, the region had an estimated mean temperature of 13–15°C, a coldest month mean of about 4°C, and a mean annual precipitation greater than 1,200 mm!³¹ This estimate is based on fossils of alligators, tortoises, flying lemurs, and other mammals and their climatic tolerances. Today, things are very different. Axel Heiberg and Ellesmere Islands are mostly frozen all year. The only trees are a few dwarf willows that grow about an inch high in the short summer. The current annual average temperature for the area is about –20°C with an annual average precipitation of only 6.5 cm.³² The average temperature for the coldest month of the year is –38°C,³³ and the lowest temperatures are around –55°C. Thus, Eocene temperatures must have been 35–40°C warmer than today!^{31,34} Considering winter minimums, the temperatures were probably as much as 55°C warmer than today, and precipitation was more than 18 times the current rate. That is a radically different climate compared to today.

All these fossils are greatly out of place for the climate and conditions there now. These Cenozoic fossils would also be out of place assuming the Ice Age was delayed for several hundred years in the post-Flood catastrophism model. This is because of powerful Cenozoic volcanism and meteorite impacts causing volcanic and impact winter (see below). Besides, winter temperatures at high latitudes and altitudes, as well as in continental interiors at mid latitudes, are mainly determined by the *angle of the sun*, which would have been the same for the first few hundred years after the Flood as today. Of course, the temperatures would not be

as cold as today with a warm ocean after the Flood,^{35,36} but the temperatures certainly would not be warm temperate to tropical in these locations.

Mix of fossil plants from widely divergent climates

One of the challenges of the Axel Heiberg Island paleoflora is the wide variety of plants and pollen from many climate zones, such as hickory, maple, elm, ash, alder, birch, beech, oak, pine, fir, cedar, hemlock, and katsura.^{37–39} Most of these indicate a warm, wet climate. The climate range varies from cool temperate to subtropical.³⁹ Swamp cypress today grows in the swamps of the Alabama wetlands⁴⁰ and the Florida Everglades.⁴¹ The spruce, larch, birch, and white pine usually represent a cooler climate.⁴²

Two hundred or more species of plants that range from tropical jungles to cool temperate regions are associated with the Yellowstone fossil ‘forests’ of the early Cenozoic.⁴³ The same climatic mix is also found at Ginkgo Petrified Forest State Park in Washington State,⁴⁴ but this is dated as late Cenozoic, the time the temperature was supposedly cooling toward the future ‘ice ages’. In north-eastern Washington State 450 species of fossil plants from diverse climates have been found at Republic and nearby Princeton, British Columbia, of the Okanogan Highlands.^{45–47} The cooler climate plants usually ‘fit’ the location, but the warm climate plants do not.

Computer simulations indicate cold winters

Uniformitarian scientists have attempted to apply computer climate simulations to the data in order to understand the inferred warm climates at mid and high latitudes.⁴⁸ However, even when temperature boosting mechanisms are used, such as lower altitudes (temperatures are generally warmer at lower altitudes), much warmer ocean temperatures, and much higher amounts of atmospheric carbon dioxide, the computer simulations all fail to produce such warm winters at high latitudes and mid-latitudinal continental interiors. Climate modellers continue to tweak their models to try to simulate an equable (i.e. little seasonal temperature change) warm climate at high latitudes. Under pressure from the geologists, their attempts to solve this ‘problem’ by manipulating the climate simulations have resulted in modest success, but they use extreme values for some of the variables in the models, such as Eocene Arctic Ocean temperatures 6–12°C warmer than today held constant. Basic meteorology

shows that these warm ocean temperatures would cool at high latitudes. Jahren and Sternberg sum up the results of climate simulations:

“Despite this myriad of paleoclimate determinations [by computer simulations], a congruent climate hypothesis remains elusive for the Eocene. Sloan and Morill (1998) described ‘persistent discrepancies’ between climate model results and interpretations from proxy data in the Eocene.”⁴⁹

Why do the simulations fail? The answer can be found in elementary meteorology. Winter temperatures at mid and high latitudes are primarily caused by *little or no sunshine* or a low angle of the sun, and there is nothing that can be done about it.

The warm climate fossils best explained by the Flood

The warm climate fossils at mid and high latitude are best explained by burial in the Flood. The plants and animals either lived at that latitude in a warm pre-Flood climate, were transported from lower latitudes on fast currents during the Flood, or both. Regardless, the fossils do not fit a post-Flood climate at all.

Cenozoic volcanic winter

Volcanism dramatically affects climate.⁵⁰ Aerosols, small particles around 1 µm or less in diameter, and sometimes ash, reflect some of the sunlight back to space (figure 4). Such loss of solar radiation would cause a cooling effect, especially over large land areas. We know that large historical volcanic eruptions cause a modest global cooling for several years (see below). However, the tremendous volcanism during the Cenozoic would have been much worse (see below), leading to an extended ‘volcanic winter’.⁵¹ This Cenozoic

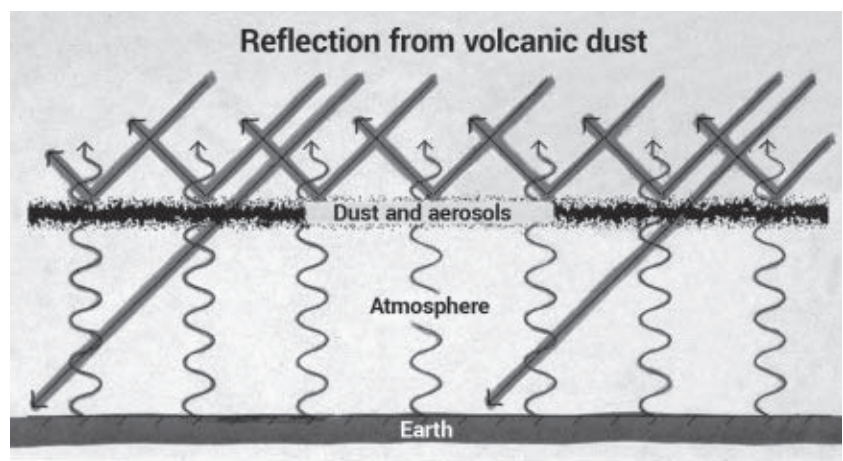


Figure 4. Schematic of the cooling effect of volcanic dust and aerosols by the reflection of some of the sunlight back to space

volcanism is best placed during the Flood. If it was after the Flood during the first few hundred years, it would likely have killed all surface life on Earth. During the Flood, such volcanism would have little atmospheric effect because the globe was covered or mostly covered by warm water, which cools very slowly. Moreover, such extensive Cenozoic volcanism, and the cooling it would have caused, makes it hard to believe that all the warm climate vegetation at mid and high latitudes, especially in continental interiors, could have occurred after the Flood.

Small volcanic eruptions do not produce a significant climatic effect, unless they are sulfur rich. It is mainly the large eruptions that inject abundant aerosols into the stratosphere that cause climatic cooling.^{52,53} The main aerosol is sulfur dioxide, which reacts with water to form sulfuric acid. The eruption of Krakatoa in 1883 is estimated to have deposited 30–100 million tons of aerosols into the global stratosphere. The net loss of solar radiation was claimed to be 4%.⁵⁴ Large eruptions will reduce solar radiation 5–7% for about a year in polar latitudes.⁵⁵ For instance, the dust and aerosols from the eruption of Mount Agung on Bali in 1963 caused an observed surface cooling of about 0.4°C in the tropics for several years.⁵⁶ Generally, these large modern eruptions cool a region or a hemisphere, or possibly the whole earth, by about 1°C. The large eruption of Tambora in 1815 in Indonesia is believed by many scientists to be responsible for the ‘year without a summer’ in New England and adjacent Canada in 1816.⁵⁷ The eruption at Laki, Iceland, in 1783, was a basalt fissure eruption, but it produced a ‘dry fog’ for several months in north-west Europe. The eruption of Laki apparently did not penetrate the stratosphere.⁵⁸ However, the abundant sulfuric acid haze has been estimated to have significantly cooled the Northern Hemisphere that winter,

producing below normal temperatures for the next two years.⁵⁹ The Toba eruption on Sumatra, dated about 74,000 years ago in the uniformitarian timescale, produced over 50 times the stratospheric aerosols as Tambora. The temperature of the Northern Hemisphere is estimated to have cooled 3–5°C for several months!⁶⁰

Studies of ‘nuclear winter’ have estimated that dust and soot blown up into the stratosphere from a nuclear exchange can cause a severe cooling by reflecting some of the sunlight back to space, dropping temperatures below freezing in a matter of days.⁶¹ Some think that the consequence would be more like a ‘nuclear fall’, not as severe but still significant.⁶² Moreover, one of the mechanisms for supposedly killing off the dinosaurs at 65 million years ago within the uniformitarian timescale is by ‘meteorite winter’, caused by a 10 km diameter asteroid hitting the Yucatán Peninsula (see next section). These ideas have spurred the notions that large volcanic eruptions, like the one on Toba, would cause ‘volcanic winter’ resulting in massive freezing across the earth.

The historical volcanic eruptions and Toba are nothing compared to what is inferred from the Cenozoic geologic record:

“Even the greatest of these historic eruptions, however, was small compared with the very large explosive and effusive eruptions that are well known from the geologic record.”⁶³

Cenozoic volcanism was enormous in many parts of the world (figure 5). If this all occurred within several hundred years following the Flood, the dust and aerosol loading of the atmosphere would have been almost continuous. It would have likely killed off all surface life.⁵⁰ In just the western

United States, several of the massive volcanic eruptions include the Columbia River Basalts of the north-west states, the San Juan volcanics of Colorado, the Challis volcanics of Idaho, the Absaroka volcanics of Montana and Wyoming, the Snake River eruptions in southern Idaho, and the Yellowstone super-eruptions. It is estimated that just one of the large flows of the Columbia River Basalts, consisting of a few hundred flows, would have produced large quantities of sulfuric acid aerosols that could reflect most sunlight back to space.⁶⁴ Since water has a high heat capacity and several mechanisms would have heated the ocean during the Flood, such drastic volcanic winter would not significantly cool the ocean water when the earth was mostly covered by the Flood water.

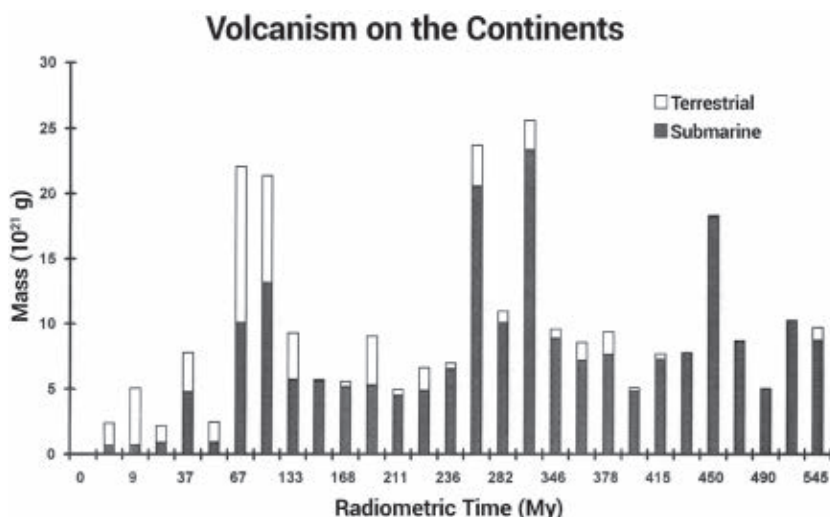


Figure 5. Distribution of Phanerozoic continental volcanics, broken up into submarine volcanics, which would not have an immediate climate effect, and presumed subaerial eruptions (from Holt,⁵⁰ p. 149). This graph does not take into account erosion, which would at least double these estimates.

Impact winter

Besides enormous volcanism during the Cenozoic, there would also have been many meteorite and/or comet impacts during this same period. Impacts would also be tremendously devastating to the post-Flood earth. As of 2011, 182 impacts had been reported by scientists,⁶⁵ with several more impact sites added each year. Phanerozoic rocks contain 155 known or claimed impacts, and Precambrian rocks contain 27. Sixty of these impacts are in the Cenozoic. Table 2 lists the location, diameter, and supposed age of all Cenozoic craters larger than 1 km, including the Chicxulub impact crater. There are 38 total craters with some quite large, such as Kara-Kul, Tajikistan, at 52 km; Chesapeake Bay, Virginia, US, at 40 km; Popigai, Russia, at 90 km; Mistasin, Canada, at 28 km; Haughton, Canada, at 23 km; Logancha, Russia, at 20 km; Kamensk, Russia, at 25 km; and Montagnais, Nova Scotia, Canada, at 45 km. I am puzzled at the small diameter cited for the Chesapeake Bay impact, which Wayne Spencer and I studied.⁶⁶ The buried crater is supposed to be about 85 km in diameter, more than twice the diameter given in Table 2.

These impacts would blast a lot of particles up into the upper atmosphere and beyond, which would reflect some of the sunlight back to space, making it unavailable to warm the earth. Although the particles from an impact would settle out quicker than volcanic aerosols, the effect of the particles would likely last around six months and result in a ‘meteorite impact winter’.⁶⁷ It is unknown how many very small particles, the size of volcanic aerosols, would result from an impact, and thus the climatic effect it would have. The smaller the particles, the longer-lasting in the upper atmosphere they would be, with their resultant climatic effect. Regardless, the climatic effect would be somewhat similar to volcanic winter.

Although there are questions on the details of the Chicxulub impact,⁶⁸ it still had a remarkably circular gravity anomaly with a peak ring and an annular low, up to several hundred metres of suevite, shocked quartz, coesite, a little pseudotachylyte, a small amount of melt, and a few shattercones.^{69,70} Of course, the Chicxulub crater is not ideal because other Flood processes would have modified the crater. It was discovered that the Chicxulub impact would disintegrate more ‘evaporites’ with high sulfate that would cause more SO₂ to enter the stratosphere than expected.⁷¹ The global temperature drop is believed to have been greater than another recent calculation of a 26°C temperature drop for three to 15 years with residual effects to 30 years,⁷² which means that it would continue well after the Flood. This is much greater than large volcanic eruptions like Tambora and even Toba. Much more dramatic cooling would have occurred because impact aerosols reach up into the mid and upper stratosphere, while volcanic aerosols usually reach only the lower stratosphere.⁷³

Table 2. Location, diameter, and supposed age of 38 Cenozoic impacts—and the Chicxulub impact at the supposed K/T boundary⁶⁵

Location	Diameter (km)	'Age' (millions of years)
Tenoumer, Mauritania	1.9	0.02
Barringer, Arizona, US	1.18	0.05
Lonar, India	1.83	0.05
Xiuyan, China	1.8	>0.05
Rio Cuarto, Argentina	4.5	~0.1
Tswaing, South Africa	1.13	0.22
Zhamanshin, Kazakhstan	14	0.9
Bosumtwi, Ghana	10.5	1.07
New Quebec, Canada	3.44	1.4
Talemzane, Algeria	1.75	~3.0
Elgygytgyn, Russia	18	3.5
Roter Kam, Namibia	2.5	3.7
Kara-Kul, Tajikistan	52	~5.0
Karla, Russia	10	5.0
Bigach, Kazakhstan	8	5.0
Colônia, Brazil	3.6	5 to 36
Steinheim, Germany	3.8	15
Ries, Germany	24	15.1
Chesapeake Bay, Virginia, US	40	35.5
Popigai, Russia	90	35.7
Flaxman, Australia	10	>35
Crawford, Australia	8.5	>35
Mistasin, Canada	28	36.4
Wanapitei, Canada	7.5	37.2
Haughton, Canada	23	39
Logancha, Russia	20	40
Beyenchime-Salaatin, Russia	8	40
Logoisk, Belarus	15	42.3
Shunak, Kazakhstan	2.8	45
Ragozinka, Russia	9	46
Chiyli, Kazakhstan	5.5	46
Kamensk, Russia	25	49

Location	Diameter (km)	'Age' (millions of years)
Gusev, Russia	3	49
Goat Paddock, Western Australia	5.1	~50
Montagnais, Nova Scotia, Canada	45	50.5
Jebel Waqf as Suwwan, Jordan	5.5	56 to 37
Marquez, Texas, US	12.7	58
Connolly Basin, Western Australia	9	~60
Chicxulub, Mexico	150	64.98

Cenozoic impacts would be much better placed during the Flood and not afterwards.

Miscellaneous factors

Radioactive decay

A great amount of radioactive decay occurred during the Cenozoic.⁷⁴ Creation scientists finished a major research endeavour in 2005 called RATE (Radioactivity and the Age of The Earth).⁷⁵ In this project, they did their own dating and made a major discovery. Besides the well-known 'precision' problems with radioactive dating (discordant dates, etc.), they discovered that radiometric dates yield 'ages' of millions and billions of years because there has been accelerated radiometric decay in Earth history at the creation and during the Flood. Accelerated radiometric decay is a solid result, based on helium diffusion out of zircon crystals.⁷⁶ Zircon crystals in a drill core down into granite showed that the diffusion of helium had taken place for only 6,000 years while the amount of decay from radioactive uranium was 1.5 billion years. The only plausible way to resolve this dilemma is if there was a period of accelerated radiometric decay in the 6,000 years of biblical Earth history. Other evidence reported that supports accelerated radiometric decay were radiohalos⁷⁷ and fission tracks.⁷⁸

Radioactive decay gives out a lot of heat and radiation, and at least a half billion years' worth of radiometric decay at present rates during the one year of the Flood would produce enough heat to melt the entire earth's crust many times over.⁷⁹ Since the Cenozoic is 12% of the time since the beginning of the Cambrian, there still would be enough heat to melt the crust or much of the crust. Cenozoic accelerated radioactive decay is best explained during the Flood and not afterwards.

Moreover, radioactive decay gives off radiation—a huge amount and enough to easily kill all life. No one can say that radioactive decay stopped at the beginning of the Cenozoic, because we have fission track evidence from the

Peach Springs tuff, dated as mid Cenozoic by uniformitarian geologists, that shows radioactive decay did occur in the Cenozoic.⁷⁸ In other words, people and animals spreading from the 'mountains of Ararat' during the Cenozoic would still be 'zapped' with so much radiation from radioactive minerals in the rocks, as well as potassium-40 in their bodies, that they would soon die, unless God of course continued to miraculously protect life on Earth after the Flood. It is more plausible to place practically all the Cenozoic within the Flood, and that all accelerated radiometric decay occurred during the Flood. Such radiometric decay still raises questions on how the occupants of the Ark survived.

The Cenozoic geology of the Middle East

The Bible is clear that the Ark landed on the 'mountains of Ararat' on the 150th day of the Flood. Although traditionally the resting place of the Ark has been considered Mount Ararat in north-east Turkey, some creationists believe the Ark landed on some other mountain range in the Middle East.^{80,81} The inhabitants of the Ark stayed on board the vessel until the end of the Flood, which means that the mountains should still exist. So, if we can geologically date the formation of the mountains of Ararat, then the 150th day of the Flood is geologically dated and the Flood/post-Flood boundary must be younger than the mountains of Ararat.⁸² Regardless of the exact location of the mountains of Ararat, ancient tradition associates Ararat with Armenia or the ancient kingdom of Urartu, which is in eastern Turkey and the area eastward.

The late Roy Holt summarized the geology of eastern Turkey and vicinity, assuming the geological column. Although the geology is complex, in general the geology is dominated by marine sedimentary rocks of various ages and volcanic rocks that include the Cenozoic, volcanic mountains not formed until the Cenozoic, and all significant mountain-building occurred during the very active Cenozoic. In other words, practically all the mountain uplift and volcanism in this region, including the Zagros Mountains of western Iran and the Caucasus Mountains north of Mount Ararat, occurred during the middle and late Cenozoic. Holt summarizes:

"Even so, the Caucasus Mountains, like other mountains in the area, appear to have reached their highest elevation in the Pliocene [late Cenozoic]. ... The geological age of the mountains in and around Urartu indicate that the 150th day of the Flood should be placed somewhere between the Palaeocene and Early Pleistocene, depending on the identification of the true Mountains of Ararat. Since the year of the Flood lasted another seven months with significant geological activity (at least massive erosion due to receding Flood waters), the Flood/post-Flood boundary must be well after the Palaeocene [very early Cenozoic]."⁸³

It seems evident that the Flood/post-Flood boundary is in the very late Cenozoic in the area of the mountains of

Ararat. It would also imply that even much of the Cenozoic was deposited before Day 150.

Conclusion

This concludes our six-part survey of 33 factors from various fields of earth science that support explaining most of the Cenozoic within the context of the Flood. A final part will provide reasonable answers to many of Whitmore's objections for a late Cenozoic Flood/post-Flood boundary.⁸⁴ There are several climatic conundrums that are solved by placing the post-Flood boundary higher, at the very late Cenozoic. Warm-climate, even subtropical, fossils found at high latitudes do not fit with the expected cold climates, even with warmer oceans immediately after the Flood. The sheer volume of aerosols inferred from terrestrial volcanic deposits and impact craters in the Cenozoic, as well as the K/Pg Chicxulub impact, would have also likely cooled the earth down sufficiently to kill all life. Accelerated nuclear decay is inferred to have continued into the Cenozoic, making it unrealistic to place those rocks after the Flood. Finally, the geology of the Middle East includes Cenozoic uplift and volcanism, which must have occurred before Noah's Ark came to rest. Thus, the Flood/post-Flood boundary is in the late Cenozoic, often in the very late Cenozoic.

References

- Oard, M.J., Flood processes into the late Cenozoic: part 1—problems and parameters, *J. Creation* **30**(1):63–69, 2016.
- Oard, M.J., Flood processes into the late Cenozoic: part 2—sedimentary rock evidence, *J. Creation* **30**(2):67–75, 2016.
- Oard, M.J., Flood processes into the late Cenozoic: part 3—organic evidence, *J. Creation* **31**(1):51–57, 2016.
- Oard, M.J., Flood processes into the late Cenozoic: part 4—tectonic evidence, *J. Creation* **31**(1):58–65, 2016.
- Oard, M.J., Flood processes into the late Cenozoic: part 5—geomorphological evidence, *J. Creation* **32**(2):70–78, 2016.
- Hickey, L.J., West, R.M., Dawson, M.R., and Choi, K.K., Arctic terrestrial biota: paleomagnetic evidence of age disparity with mid-northern latitudes during the Late Cretaceous and early Tertiary, *Science* **221**:1153–1156, 1983.
- Creber, G.T. and Chaloner, W.G., Influence of environmental factors on the wood structure of living and fossil trees, *The Botanical Review* **50**:357–448, 1984.
- Creber, G.T. and Chaloner, W.G., Tree growth in the Mesozoic and early Tertiary and the reconstruction of palaeoclimates, *Palaeogeography, Palaeoclimatology, Palaeoecology* **52**:35–60, 1985.
- Chaney, R.W., Miocene floras of the Columbia Plateau: part I—composition and interpretation, *Carnegie Institution of Washington Publication* 617, Washington D.C., pp. 1–134, 1959.
- Clutter, T., The Clarkia fossil bowl, *American Forests* **91**(2):22–25, 1985.
- Cronin, T.M. and Dowsett, H.J., PRISM—warm climates of the Pliocene, *Geotimes* **38**(11):17–19, 1993.
- Funder, S., Abrahamsen, N., Bennike O., and Feyling-Hanssen, R.W., Forested Arctic: evidence from North Greenland, *Geology* **13**:542–546, 1985.
- Hills, L.V. and Ogilvie, R.T., *Picea banksii* n. sp. Beaufort Formation (Tertiary), northwestern Banks Island, Arctic Canada, *Canadian J. Botany* **48**:457–464, 1970.
- Matthews, Jr., J.V., Plant macrofossils from the Neogene Beaufort Formation on Banks and Meighen Islands, District of Franklin, *Geological Survey of Canada Paper* 87-1A, Ottawa, Canada, pp. 73–87, 1987.
- Spicer, R.A., Ahlberg, A., Herman, A.B., Hofmann, C.-C., Raikovich, M., Valdes, P.J., and Markwick, P.J., The Late Cretaceous continental interior of Siberia: a challenge for climate models, *Earth and Planetary Science Letters* **267**:228–235, 2008.
- Oard, M.J., Climate models fail to produce warm climates of the past, *J. Creation* **23**(2):11–13, 2009; creation.com/climate-models-fail.
- Collinson, M.E. and Hooker, J.J., Vegetational and mammalian faunal changes in the early Tertiary of southern England; in: Friis, E.M., Chaloner, W.G. and Crane P.R. (Eds.), *The Origins of Angiosperms and Their Biological Consequences*, Cambridge University Press, Cambridge, UK, pp. 259–303, 1987.
- Schweitzer, H.-J., Environment and climate in the early Tertiary of Spitsbergen, *Palaeogeography, Palaeoclimatology, Palaeoecology* **30**:297–311, 1980.
- Koch, B.E., Fossil plants from the lower Paleocene of the Agatdalen (Angmåtussut) area, central Nūgssuaq Peninsula, northwest Greenland, *Meddelelser Om Grønland* **172**(5):1–120, 1963.
- Grande, L., Paleontology of the Green River Formation with a review of the fish fauna, *The Geological Survey of Wyoming Bulletin* 63, Laramie, WY, 1984.
- Brattstrom, B.H., Some new fossil tortoises from western North America with remarks on the zoogeography and paleoecology of tortoises, *J. Paleontology* **35**:543–560, 1961.
- Wing, S.L. and Greenwood, D.R., Fossils and fossil climate: the case for equable continental interiors in the Eocene, *Philosophical Transactions of the Royal Society of London B* **341**:243–252, 1993.
- Kerr, R.A., Fossils tell of mild winters in an ancient hothouse, *Science* **261**:682, 1993.
- Wolfe, J.A., Paleogene floras from the Gulf of Alaska region, *US Geological Survey Professional Paper* 997, US Government Printing Office, Washington D.C., 1977.
- Smiley, C.J. (Ed.), *Late Cenozoic History of the Pacific Northwest—Interdisciplinary studies on the Clarkia fossil beds of northern Idaho*, Pacific Division of the American Association for the Advancement of Science, San Francisco, CA, 1985.
- Oard, M.J., Cold oxygen isotope values add to the mystery of warm climate wood in NE Canada, *J. Creation* **17**(1):3–5, 2003; creation.com/images/pdfs/tj/tj17_1/tj17_1_3-5.pdf.
- Greenwood, D.R. and Basinger, J.F., Stratigraphy and floristics of Eocene swamp forests from Axel Heiberg Island, Canadian Arctic archipelago, *Canadian J. Earth Sciences* **30**:1914–1923, 1993.
- Francis, J.E., A 50-million-year-old fossil forest from Strathcona Fiord, Ellesmere Island, Arctic Canada: evidence for a warm polar climate, *Arctic* **41**:314–318, 1988.
- Estes, R. and Hutchison, J.H., Eocene lower vertebrates from Ellesmere Island, Canadian Arctic Archipelago, *Palaeogeography, Palaeoclimatology, Palaeoecology* **30**:225–247, 1980.
- McKenna, M.C., Eocene paleolatitude, climate, and mammals of Ellesmere Island, *Palaeogeography, Palaeoclimatology, Palaeoecology* **30**:349–362, 1980.
- Greenwood, D.R., Basinger J.F., and Smith, R.Y., How wet was the Arctic Eocene rain forest? Estimates of precipitation from Paleogene Arctic macrofloras, *Geology* **38**(1):15–18, 2010.
- Tarnocai, C. and Smith, C.A.S., Paleosols of the fossil forest area, Axel Heiberg Island; in: Christie, R.L. and McMillan N.J. (Eds.), Tertiary fossil forests of the Geodetic Hills, Axel Heiberg Island, Arctic Archipelago, *Geological Survey of Canada Bulletin* 403, Ottawa, Canada, pp. 171–187, 1991.
- Pearce, F., Ancient forests muddy global warming models, *New Scientist* **140**(1901):6–7, 1992.
- Eberle, J., Fricke H., and Humphrey, J., Lower-latitude mammals as year-round residents in Eocene Arctic forests, *Geology* **37**(6):499–502, 2009.
- Gollmer, S.M., Initial conditions for a post-Flood Ice Age; in: Horstemeyer, M. (Ed.), *Proceedings of the Seventh International Conference on Creationism*, Creation Science Fellowship, Pittsburgh, PA, 2013.
- Gollmer, S.M., Effects of aerosol distribution on precipitation patterns needed for a rapid ice age; in: Whitmore, J.H. (Ed.), *Proceedings of the Eighth International Conference on Creationism*, Creation Science Fellowship, Pittsburgh, PA, pp. 695–706, 2018.
- Francis, J.E., Polar fossil forests, *Geology Today* **6**:92–95, 1990.
- Basinger, J.F., The fossil forests of the Buchanan Lake Formation (early Tertiary), Axel Heiberg Island, Canadian Arctic archipelago: preliminary floristics and paleoclimate; in: Christie, R.L. and McMillan N.J. (Eds.), Tertiary Fossil Forests of the Geodetic Hills, Axel Heiberg Island, Arctic Archipelago, *Geological Survey of Canada Bulletin* 403, Ottawa, Canada, pp. 39–56, 1991.

39. McIntyre, D.J., Pollen and spore flora of an Eocene forest, eastern Axel Heiberg Island, N.W.T.; in: Christie, R.L. and McMillan N.J. (Eds.), Tertiary Fossil Forests of the Geodetic Hills, Axel Heiberg Island, Arctic Archipelago, *Geological Survey of Canada Bulletin 403*, Ottawa, Canada, pp. 83–97, 1991.
40. Francis, J.E., The dynamics of polar forests: Tertiary fossil forest of Axel Heiberg Island, Canadian Arctic archipelago; in: Christie, R.L. and McMillan N.J. (Eds.), Tertiary Fossil Forests of the Geodetic Hills, Axel Heiberg Island, Arctic Archipelago, *Geological Survey of Canada Bulletin 403*, Ottawa, Canada, pp. 29–38, 1991.
41. Francis, J.E., Arctic Eden, *Natural History* **100**(1):57–64, 1991.
42. Obst, J.R., McMillan, N.J., Blanchette, R.A., Christensen, D.J., Faix, O., Han, J.S., Kuster, T.A., Landucci, L.L., Newman, P.J., Petterson, R.C., Chwandt V.H., and Mesolowski, M.F., Characterization of Canadian Arctic fossil woods; in: Christie, R.L. and McMillan N.J. (Eds.), Tertiary Fossil Forests of the Geodetic Hills, Axel Heiberg Island, Arctic Archipelago, *Geological Survey of Canada Bulletin 403*, Ottawa, Canada, pp. 123–146, 1991.
43. Coffin, H.G., The Yellowstone petrified ‘forests’, *Origins* **24**(1):5–44, 1997.
44. Coffin, H.G., Vertical flotation of horsetails (*Equisetum*): geological implications, *GSA Bulletin* **82**:2019–2022, 1971.
45. Wolfe, J.A. and Wehr, W., Middle Eocene dicotyledonous plants from Republic, Washington, *US Geological Survey Bulletin 1597*, US Government Printing Office, Washington, DC, 1987.
46. Labandeira, C.C., Paleobiology of middle Eocene plant-insect associations from the Pacific Northwest: a preliminary report, *Rocky Mountain Geology* **37**(1):31–59, 2002.
47. Oard, M.J., Tropical cycad reinforces uniformitarian paleofloristic mystery, *J. Creation* **12**(3):261–262, 1998; creation.com/images/pdfs/tj/j12_3/j12_3_261-262.pdf.
48. Oard, M.J., *The Genesis Flood and Floating Log Mats: Solving Genesis Riddles*, Creation Book Publishers ebook, 2013.
49. Jahren, A.H. and Sternberg, L.S.L., Eocene meridional weather patterns reflected in the oxygen isotopes of Arctic fossil wood, *GSA Today* **12**(1), p. 6, 2002.
50. Holt, R.D., Evidence for a late Cainozoic Flood/post-Flood boundary, *J. Creation* **10**(1):128–167, 1996; pp. 140–145.
51. Mason, B.G., Pyle, D.M., and Oppenheimer, C., The size and frequency of the largest explosive eruptions on Earth, *Bulletin of Volcanology* **66**:735–748, 2004.
52. Oard, M.J., *An Ice Age Caused by the Genesis Flood*, Institute for Creation Research, Dallas, TX, pp. 33–38, 67–70, 1990.
53. Oard, M.J., *Frozen in Time: Woolly Mammoths, the Ice Age, and the Biblical Key to Their Secrets*, Master Books, Green Forest, AR, pp. 71–74, 2004.
54. Oliver, R.C., On the response of hemispheric mean temperature to stratospheric dust: an empirical approach, *J. Applied Meteorology* **15**:933–950, 1976.
55. Mass, C.F. and Portman, D.A., Major volcanic eruptions and climate: a critical evaluation, *J. Climate* **2**:566–593, 1989.
56. Hansen, J.E., Want, W.C., and Lacis, A.A., Mount Agung eruption provides test of a global climatic perturbation, *Science* **199**:1065–1068, 1978.
57. Hughes, P., The year without a summer, *Weatherwise* **32**:108–111, 1979.
58. Stothers, R.B., Wolff, J.A., Self, S., and Rampino, M.R., Basaltic fissure eruptions, plume heights, and atmospheric aerosols, *Geophysical Research Letters* **13**(8):725–728, 1986.
59. Rampino, M.R., Self, S., and Stothers, R.B., Volcanic winters, *Annual Review of Earth and Planetary Science* **17**:73–99, 1988.
60. Rampino, M.R. and Self, S., Climate-volcanism feedback and the Toba eruption of ~74,000 years ago, *Quaternary Research* **40**:269–280, 1993.
61. Toon, O.B., Pollack, J.P., Ackerman, T.P., Turco, R.P., McKay, C.P., and Liu, M.S., Evolution of an impact-generated dust cloud and its effects on the atmosphere; in: Silber, L.T. and Schultz, P.H. (Eds.), Geological Implications of Impacts of Large Asteroids and Comets on the Earth, *GSA Special Paper 190*, Geological Society of America, Boulder, CO, pp. 187–200, 1982.
62. Beardsley, T., Has winter become fall? *Nature* **320**:103, 1986.
63. Rampino *et al.*, ref. 59, p. 94.
64. Rampino, M.F. Stothers, R.B., and Self, S., Climatic effects of volcanic eruptions, *Nature* **313**:272, 1985.
65. Earth impact database, passc.net/EarthImpactDatabase/Agesort.html, accessed 14 December 2018.
66. Spencer, W.R. and Oard, M.J., The Chesapeake Bay impact and Noah’s Flood, *Creation Research Society Quarterly* **41**(3):206–215, 2004.
67. Toon, W.B., Turco, R.P., and Covey, C., Environmental perturbations caused by the impacts of asteroids and comets, *Reviews of Geophysics* **35**(1):41–78, 1997.
68. Clarey, T.L., Do the data support a large meteorite impact at Chicxulub? *Answers Research J.* **10**:71–88, 2017.
69. Christeson, G.L. *et al.*, Extraordinary rocks from the peak ring of the Chicxulub impact crater: P-wave velocity, density, and porosity measurements from IODP/ICDP Expedition 364, *Earth and Planetary Science Letters* **495**:1–11, 2018.
70. Kring, D.A., Claeys, P., Gulick, S.P.S., Morgan, J.V., and Collins, G.S., IODP-ICDP Expedition 364 Science Party, Chicxulub and the exploration of large peak-ring impact craters through scientific drilling, *GSA Today* **27**: 1–8, 2017 | doi: 10.1130/GSATG352A.1.
71. Artemieva, N., Morgan, J., and Expedition 364 Scientific Party, Quantifying the release of climate-active gases by large meteorite impacts with a case study of Chicxulub, *Geophysical Research Letters* **44**:10180–10188, 2017.
72. Brugger, J., Feulner, G., and Petri, S., Baby, it’s cold outside: climate model simulations of the effects of the asteroid impact at the end of the Cretaceous, *Geophysical Research Letters* **44**:419–427, 2017.
73. Robock, A., Oman, L., and Stenchikov, G.L., Nuclear winter revisited with a modern climate model and current nuclear arsenals: still catastrophic consequences, *J. Geophysical Research* **112**(D13107):1–14, 2007.
74. Holt, ref. 50, p. 161.
75. Vardiman, L., Snelling, A.A., and Chaffin, E.F. (Eds.), *Radioisotopes and the Age of the Earth: volume II—results of a young-earth creationists research initiative*, Institute for Creation Research and Creation Research Society, Dallas, TX, and Chino Valley, AZ, 2005.
76. Humphreys, D.R., Young helium diffusion age of zircons supports accelerated nuclear decay; in: Vardiman, L., Snelling, A.A., and Chaffin, E.F. (Eds.), *Radioisotopes and the Age of the Earth: volume II—results of a young-earth creationists research initiative*, Institute for Creation Research and Creation Research Society, Dallas, TX, and Chino Valley, AZ., pp. 25–100, 2005.
77. Snelling, A.A., Radiohalos in granites: evidence for accelerated nuclear decay; in: Vardiman, L., Snelling, A.A., and Chaffin, E.F. (Eds.), *Radioisotopes and the Age of the Earth: volume II—results of a young-earth creationists research initiative*, Institute for Creation Research and Creation Research Society, Dallas, TX, and Chino Valley, AZ., pp. 101–207, 2005.
78. Snelling, A.A., Fission tracks in zircons: evidence for abundant nuclear decay; in: Vardiman, L., Snelling, A.A., and Chaffin, E.F. (Eds.), *Radioisotopes and the Age of the Earth: volume II—results of a young-earth creationists research initiative*, Institute for Creation Research and Creation Research Society, Dallas, TX, and Chino Valley, AZ., pp. 209–324, 2005.
79. Vardiman, L., Austin, S.A., Baumgardner, J.R., Boyd, S.W., Chaffin, E.F., DeYoung, D.B., Humphreys, D.R., and Snelling, A.A., Summary of evidences for a young earth from the RATE project; in: Vardiman, L., Snelling, A.A., and Chaffin, E.F. (Eds.), *Radioisotopes and the Age of the Earth: volume II—results of a young-earth creationists research initiative*, Institute for Creation Research and Creation Research Society, Dallas, TX, and Chino Valley, AZ., pp. 735–772, 2005.
80. Crouse, B., The landing place, *J. Creation* **15**(3):10–18, 2001.
81. Humphreys, D.R., Where is Noah’s Ark?—a close look at the biblical clues, *J. Creation* **25**(3):6–8, 2011.
82. Holt, ref. 50, pp. 145–149.
83. Holt, ref. 50, p. 148.
84. Whitmore, J., The potential for and implications of widespread post-Flood erosion and mass wasting processes; in: Horstemeyer, M. (Ed.), *Proceedings of the Seventh International Conference on Creationism*, Creation Science Fellowship, Pittsburgh, PA, 2013.

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New cosmologies converge on the ASC model—a review of two cosmology papers presented at the International Conference on Creationism in 2018

John G. Hartnett

Two new biblical creationist cosmogony papers were presented at the 2018 International Conference on Creationism. The authors of both papers arrive at similar conclusions regarding the biblical creationist starlight travel-time problem. The result is essentially the same as that presented many years earlier by Jason Lisle in his Anisotropic Synchrony Convention (ASC) model. The approach taken is that God created the initial conditions of the universe on Day 4 of Creation Week such that light from all the stars arrived at Earth for the first time on Day 4. This paper discusses the similarities between the different authors and compares their results with Lisle's ASC model. Under the assumption of the ASC, events are timestamped by when an Earth observer first saw them occur. That convention defines the universal present, which we call 'now'. Thus, whatever we see in the universe, under this clock synchrony convention, is in the universal 'now'. Therefore, we are seeing the state of the stars and galaxies as they are now, and not at some time millions or billions of years in the past. As a result, it follows, there is no starlight travel-time problem. It is significant that three different cosmological models arrive at the same conclusion.

In 2001 Jason Lisle (under the pen name Robert Newton) introduced the idea of Anisotropic Synchrony Convention (ASC) into the discussion amongst biblical creationists to solve the starlight travel-time problem.¹ The ASC is a convention on clock synchronization, or put another way, the conventionality of the simultaneity of distant events in spacetime.

This topic is relevant to the discussion of the creation of the stars in the universe on Day 4 of Creation Week about 6,000 years ago. The ASC posits that an event occurs when an Earth observer sees, or could have seen, the event happen. And Lisle proposed that the ASC is the language used in the Bible. As such it leads to the initial simultaneous² creation of all stars in the universe on Day 4, where, in principle, the event is timestamped³ as occurring when the starlight from all stars arrived on Earth for the first time. This means there is no light travel-time problem because the events were seen to occur (on Earth) simultaneously (or at least, within the period of one Earth day, that is, on Day 4). Therefore, there is no light travel-time problem.

In 2010 Lisle strengthened his original arguments with a discussion of the past light cone and Special Relativity.⁴ In that paper he introduced the ASC model, a model that uses the ASC. And his ASC model makes testable predictions.⁵

Lisle also carried further the notion of the one-way speed of light. Since the one-way speed of light cannot be measured

it really has no physical meaning in the universe.⁶ Thus there is a free choice. And by Lisle's choice of the ASC it follows that the incoming speed of light is infinite, and thus the outgoing speed must be $\frac{1}{2}c$ (where $c \equiv 299,792,458$ m/s is the canonical isotropic—i.e. two-way—speed of light that we are very familiar with).⁷

Many people, biblical creationists included, have expressed disbelief, concern, and other emotions over the concept of the one-way speed of light being any different from the usually assumed isotropic speed c . Nevertheless it is important to note that concepts around the one-way speed of light are based on real physics.

The choice of a timing convention in no way affects any underlying physics. The physics is always the same no matter what convention one may choose.⁸ Einstein chose a value of the clock synchronization parameter, known as the Reichenbach synchronization parameter (ϵ), in his equations for Special Relativity that *defines* the one-way speed of light as being equal to the two-way speed.⁹ Any value for the parameter ϵ between 0 and 1 may be chosen. Nature itself does not choose, nor impose any requirement on its value within this domain. The parameter represents our free choice of a timing convention. Hence we are free to choose any value of the Reichenbach synchronisation parameter ϵ , provided it is between 0 and 1. Einstein chose $\epsilon = \frac{1}{2}$ (ESC) and Lisle chose $\epsilon = 1$ (ASC). Choosing a

value for this parameter is in no way dissimilar to a choice of a different coordinate system. And regardless of which coordinate system one may choose the underlying physics is unaffected. What is different is only how we represent the physics in the different coordinate system. The equations of motion may be more complex in one coordinate system than in another but in all cases the physics is unaffected.¹⁰

Thus no amount of appealing to Maxwell's equations (derived pre-Einstein)¹¹ or any other well-known physics can refute the notion of free choice for the one-way speed of light, or more precisely, the conventionality thesis of distant simultaneity.

In most cases where this has been attempted it has been largely based on *petitio principia* (or begging the question, that is, assuming in the premise that you are trying to prove). Often the assumption is very subtle. But in all such cases, in the premise the speed of light is implicitly assumed to be isotropic and subsequently used to 'prove' that the one-way speed of light is equal to the isotropic (or two-way) speed of light.

Maxwell's equations only predict an isotropic speed of light when the chosen value of the Reichenbach synchronization parameter $\epsilon = \frac{1}{2}$. The generalised Maxwell equations allow for non-isotropic propagation of light where $\epsilon \neq \frac{1}{2}$. Therefore under the ASC with $\epsilon = 1$ the non-isotropic propagation of light is permitted by Maxwell's equations.¹²

And some argue that the one-way speed of light being different in opposite propagation directions is absurd. Nature just cannot be that way. They base that view on symmetry arguments, saying light must travel the same speed in all directions because that is the way the universe must be. This misses the whole point of the conventionality thesis. Because it is empirically impossible to measure the one-way speed of light, due to the fact that distant clocks cannot be synchronized except by sending a light signal, then one cannot say anything meaningful about the one-way speed.

In 1925 Reichenbach wrote:

"Thus we are faced with a circular argument. To determine the simultaneity of distant events we need to know a velocity and to measure a velocity we require knowledge of the simultaneity of distant events. The occurrence of this circularity proves that simultaneity is not a matter of knowledge, *but of a coordinate definition*, since the logical circle shows that a knowledge of simultaneity is impossible in principle [emphasis added]."¹³

Two new cosmologies

At the 2018 International Conference on Creationism (ICC) two papers were presented that largely boil down to the same model that Lisle originally presented. Those papers are:

1. Tenev, T.G., Baumgardner, J., and Horstemeyer, M.F., *A solution for the distant starlight problem using Creation Time Coordinates*.¹⁴
2. Dennis, P.W., *Consistent young earth relativistic cosmology*.¹⁵

This fact is quite significant because, since 2001, I have largely supported the ideas that Lisle has presented. Others within the creationist community have not been so accepting of them or have not really understood them. Personally, I now take the position that a biblical creationist model based on the ASC, or at least the concept of defining an initial creation scenario that involves the ASC, or a variant of it, such as suggested in the two papers listed above, is the best solution to the creationist starlight travel-time problem. In such a case, there is no light travel-time problem.

In explaining to lay Christian audiences I have found that the biggest stumbling block to them understanding the concepts behind such a simple solution is that they have already formed in their minds the notion that *the speed of light is isotropic*, as if this has been proven by experiment. Certainly this is true for those with some scientific knowledge. Thus, implicitly, they assume the Einstein Synchrony Convention (ESC) to be some sort of absolute universal rule, and that assumes isotropy for the speed of light. After that they cannot conceive of how light from the distant galaxies could reach Earth instantaneously.

Distant clocks are unsynchronized with Earth clocks. In the cosmogony Lisle considered the divine creation of all stars and galaxies is *assumed simultaneous by convention*. It is not (even in principle) empirically measurable. So you could even say that it is irrelevant. What is relevant to the ASC model is that the event of their creation was timestamped by when the light first arrived at Earth. That was measurable. And that was true for all stars on Day 4.

Creation time coordinates

The abstract of the paper, *A solution for the distant starlight problem using Creation Time Coordinates*, by Tenev *et al.* states:

"We present a solution for the distant starlight problem that is consistent with Scripture, Special Relativity, and observations of a young cosmos that is based on a *special divine choice of initial conditions and a new synchrony convention*. The initial conditions constrain the spacetime coordinates of all stellar creation events (Genesis 1:17) to be just outside the past light cone of Earth's Day Four but within the past light cone of Earth's Day Five while also being causally independent from one another. The synchrony convention interprets God's numbering of the creation days in Genesis 1 as prescribing a time coordinate for each location in the cosmos, a

coordinate we call the Creation Time Coordinate (CTC) [emphasis added].”¹⁴

The main features are the special choice of initial conditions and a ‘new’ synchrony convention. I put the word ‘new’ in quotes because I don’t agree that it is actually a new convention.

In fact, the model they present is Lisle’s ASC model, only that they have explicitly (and correctly) defined their initial conditions. They make use of the standard relativistic light-cone (drawn under the assumption of the ESC with the speed of light as the isotropic two-way speed c). They show their coordinates (on standard axes labelled x and ct) with a hypersurface representing the Genesis 1 time coordinate (CTC) defining the Day 4 initial creation of the stars in the heavens. However if one were to extend the axes to the Hubble length (of order c/H_0), their hypersurface would be shown to be asymptotically close to the past light cone surface for Day 4. Hence on such a diagram one would be hard pressed to see any substantive difference with that prescribed in Lisle’s ASC model.

Tenev *et al.* make the claim that their CTCs are an improvement on Lisle’s model because they are defined as ontologically objective coordinates. However, in my opinion, they are identical with Lisle’s ASC coordinates when one considers Earth as the only point of reference. That is, only Earth observers matter in the Genesis description. This point is conceded in the paper. They make the argument that their approach is superior. Lisle’s approach is observer dependent, whereas they invoke the singular independent Observer, the Creator Himself. Hence ontologically they define a singular special initial condition for the creation of the stars on Day 4.

In regards to Lisle’s ASC model, we can say that there were ‘observers’ on Earth, and only on Earth, on Day 4. These could have been, for example, crystals or plants. Crystals respond to light of various wavelengths and so do plants. Hence when light from the stars initially arrived on Earth on Day 4, these observers define that initial condition. I would make the argument that this fact makes it objective, since this is the only frame of reference that biblically matters. I have always used this argument when presenting the ASC model. So in terms of ontology any real difference between Lisle’s and the CTC model is marginal at best.

Having said that, I applaud the clarity with which Tenev *et al.* define their model. In my view, it is a small refinement on the ASC model.

The authors do not seem to fully appreciate that no measurement can ever empirically determine their initial hypersurface. That is the hypersurface that defines the present moment called ‘now’ for any observer, which might have observed the creation of the celestial lights (sun, moon and stars) on Day 4 of Creation Week, about 6,000 years ago. This is stated explicitly by Dennis in his paper:

“Our solution to the light travel time problem

will be based on presentism and the fact that *GR specifically and the relativity principle in general prohibits any empirical method of determining a putative hypersurface in space-time that is the present.* Thus, any spatial 3-surface that represents an actual ‘now’ (which must exist according to presentism, though in principle operationally undetectable) and explains the distant light arrival is acceptable [emphasis added].”¹⁵

Tenev *et al.*’s CTC coordinates define the ‘now’ for the creation of the stars on Day 4. But no method can empirically determine such a hypersurface. No experiment can be carried out—given unlimited resources and time—that could get a definite empirical result.

The problem is that the CTCs assume unsynchronized clocks. The authors impose a sort of God-synchronized condition on them, but from an experimentalist point of view they are unsynchronized because without sending light signals between the putative clocks they are, by definition, unsynchronized. Any Earth observer cannot know the state of distant clocks without comparing them with his local clock. And such an experiment requires the assumption of a synchrony convention.

Thus the discussion in their section E is flawed, yet it does not undermine the paper except in any claim of empirically determining any hypersurface for an initial condition of creation of the stars. Any claim that that is possible ignores the circularity in the argument. This is the same issue with measuring the one-way speed of light. It is just not possible. Note Reichenbach’s statement above. For a detailed discussion on this matter refer Lisle’s rebuttal of a paper he reviewed claiming that the one-way speed of light can be measured and has physical meaning.¹⁶

All that to say that their CTCs are no more physically realizable than any other coordinates. The authors comment that their CTCs are as valid as standard co-moving coordinates used in big bang cosmology. In standard Friedmann-Lemaître (FLRW) cosmology it is *assumed* that co-moving coordinates represent inertial clocks, freely falling with their sources. They are assumed to be in such a state, in an expanding universe, from which any past epoch of the universe is determined. CTCs are also limited in the same way. As stated above such coordinates can only be assumed, not empirically determined. After all, any cosmology is always underdetermined.¹⁷

This may not be very satisfactory, but I believe the reality is what God’s Words say. However we can never devise an experiment that can uniquely distinguish a biblical model (cosmology and/or cosmogony) from all others and determine some objective reality for the cosmos, even though we know that all non-biblical models are spurious.

Reality of time

Dennis's paper, *Consistent young earth relativistic cosmology*, argues for the same initial conditions as that in the ASC model. Dennis states in his abstract:

"We present a young earth creationist (YEC) model of creation that is consistent with distant light from distant objects in the cosmos. We discuss the reality of time from theological/philosophical foundations. This results in the rejection of the idealist viewpoint of relativity and the recognition of the reality of the flow of time and the existence of a single cosmological 'now'."¹⁵

Dennis discusses the philosophical issues of eternalism and presentism. On these the author

"... concludes with the biblically uncontroversial view that time is real and that only the present 'now' is real. This view is termed 'presentism'."¹⁵

And he writes:

"... there is an actual real moment called 'now,' a present moment that continually passes. The past is forever gone, the future will be."¹⁵

Eternalism is the philosophical belief that time is an illusion. That is,

"... that past, present and future events are eternally existing in a universe in which time has been 'spatialized'. It is a universe in which there is no 'now'—no unique 'present'. It is sometimes called a 'block-house' universe in which nothing really happens."¹⁵

Einstein was an advocate of eternalism.¹⁸ And Dennis quotes Einstein:

"For us believing physicists, the distinction between past, present and future is only a stubbornly persistent illusion."¹⁹

"The four-dimensional continuum is now no longer resolvable objectively into sections, which contain all simultaneous events; 'now' loses for the spatially extended world its objective meaning. It is because of this that space and time must be regarded as a four-dimensional continuum that is objectively unresolvable."²⁰

Yet, as Dennis correctly points out, this does not mean that the present is not real, i.e. that such a concept does not exist in spacetime. What it means is that it cannot be operationally empirically determined:

"In short, an unknown and operationally indeterminable 'now' does not imply the nonexistence of 'now' [emphasis in original]."¹⁵

In philosophical terms the ASC defines a universal 'now' for all events regardless of their location in space. From Dennis's perspective he would argue that this convention requires a presentist worldview. This is not necessarily the case. General Relativity does not require that one accepts a particular philosophical worldview. The application of General Relativity may be valid regardless of which philosophy one may take; yet interpreting the meaning of that application may vary according to one's philosophical position. Even the model presented by Dennis does not depend on a presentist philosophy.

I would think that eternalism is the philosophical view currently held by most practitioners of Einstein's General Relativity theory, in which the universe is seen as a block-house four-dimensional construction, with the past, the present, and the future all existing together (see figure 1). As such time does not exist, it is only an illusion. Instead it is 'spatialized' with the three usual space coordinates into a 4D metrical representation of spacetime. However, even eternalists have to deal with the passage of time. They

might have more of a problem putting it into words, but mathematically it is well described by the choice of the spacetime metric.

One's choice of philosophy regarding time, e.g. presentism or eternalism, does not necessarily determine one's cosmology or cosmogony.²¹ Some insight can be gained from a discussion of the philosophy of time, but a particular choice is not essential. Besides, there is no empirical way to distinguish between presentism and eternalism. They are philosophies and as such are only assumed.

I contend that what is essential is one's choice of clock synchrony convention. That choice leads to how

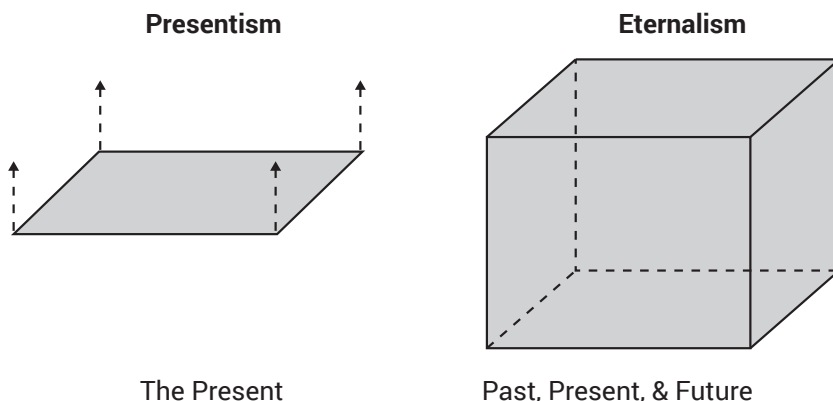


Figure 1. Presentism vs eternalism. Under presentism, time is real and the present we experience is universal. This is illustrated by the plane (left) representing space but no past or future. Under eternalism, time is an illusion and the past, present and future all exist together. The line shown here (right) is the worldline of a particle passing through the block-house of spacetime. The solid line is in the past and the broken line is in the future.

one interprets one's cosmogony. Nevertheless there is no natural choice of a synchrony convention. You cannot say one is 'correct' and that all other conventions are 'wrong'.

One cannot determine from nature whether the concept of a universal 'now' is real or imagined. One must look elsewhere, that is, to the Source of all knowledge. Dennis argues that:

"... the strongest argument for the reality of time is from the presupposition of Christian theism.

From a theological perspective, the unreality of time is incompatible with biblical revelation. First, and most important, the reality of time is presented in the Bible in the opening verses of Genesis that describe the *miraculous* creation week and the occurrence of the *first day*."¹⁵

Time is real and the biblical account steps off the sequence very definitively in Genesis 1. Events are timestamped by when any Earth 'observer' sees them happen. Tenev *et al.* argue that it is the Creator who defines that sequence via special objective time coordinates, especially for Day 4, so that all stars are created so that their light arrives during Day 4.

An inhomogeneous cosmology

Dennis works from the basis that presentism is the correct philosophical view consistent with the Bible, though I would argue that his model does not depend upon it. He

outlines how one might construct a cosmology, based on general inhomogeneous models. These considerations all point to a solution that is based on the recognition that Einstein's Field Equations (EFE) depend upon the specification of an initial condition specified on a given initial spatial hypersurface. The general inhomogeneous solution shows that the time of the initial spatial hypersurface is arbitrary within the mathematical framework of General Relativity. This is a very important point to note: *the initial spatial hypersurface is arbitrary* within the mathematical framework of General Relativity. We are free to choose.

Dennis develops an inhomogeneous model based on a solution of EFE with a coordinate origin near Earth (i.e. spherical coordinates are used centred on the observer on Earth). The only real difference with his cosmology and that of standard big bang cosmology is the choice of the initial creation surface. He describes it as a "non-simultaneous" Big Bang relative to the usual FLRW 'cosmological time' but viewed as simultaneous within the hyperbolic surface."

Viewed as simultaneous within the hypersurface means that it is chosen that way by choice of the initial creation condition. Then if after the initial creation moment time advances (time being real) the asymptotically null *spacelike* surfaces maintain their hyperbolic property. This means that light travels uniformly from that moment and the surface expands by the distance ct in time t . Dennis states:

"However, there is nothing to preclude God from advancing the remote regions more rapidly thereby yielding a non-null hypersurface. That concept is consistent with the biblical account. [His] Figure 9 illustrates this concept."

This then leads to the notion of a difference in the speeds of the incoming and outgoing light rays. And by appropriate choice of a free parameter in his model the incoming light rays from distant stars can reach Earth instantaneously.

Thus by the end of his paper, Dennis gets to a similar beginning creation scenario as Tenev *et al.* (see his figure 9). This is a sketch of what he expects to develop with further research. Dennis describes a sequence of hypersurfaces indexed by cosmic time t , which records the days of creation from Day 1. Each hypersurface represents the universal 'now' for that day. Each hypersurface

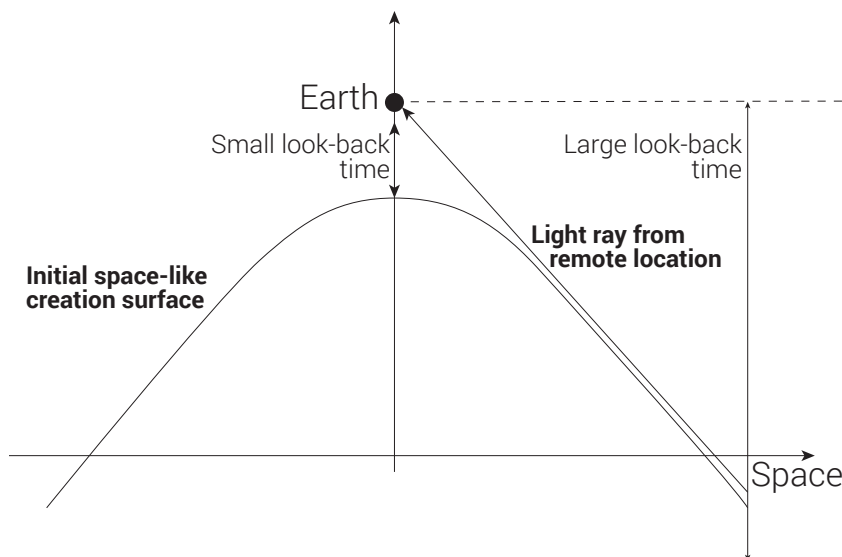


Figure 2. Reproduced from Dennis's figure 8. A solution to the light travel-time problem based on a hyperbolic initial creation surface given by a function t (vertical axis) in terms of the standard big bang FLRW cosmic time coordinate. Due to the curvature of the surface the look-back time at Earth increases with distance. The creation surface occurs simultaneously at the beginning of Day 1, even though the 'look-back time' (relative to the FLRW extrapolated 'cosmic time') for distant events is very large. The null rays of the past light closely follow the hyperbolic curve. The same is true for all creation days.

is *spacelike*, meaning events are not causally connected, and the light from all events on each day (creation of stars on Day 4) arrives at Earth for the first time during that day. This is the same result as in Tenev *et al.*'s and Lisle's models.

A comparison of Tenev *et al.*'s figure 1 and Dennis's figure 8 (see figure 2 here) showing their initial creation hypersurfaces represented on a light-cone indicates that there are strong similarities with certain features in their models and Lisle's. Both employ initial hyperbolic creation hypersurfaces. Both are centred on Earth. Both asymptotically approach the past light cone. In that limit they are the same as Lisle's. Dennis starts with Day 1 creation, whereas Tenev *et al.* focus on the Day 4 creation of the stars. Nevertheless for Day 4 both would draw the same initial *spacelike* hypersurface for the creation of the heavenly host.

Conclusion

This is the first time where three different authors have arrived at similar biblical creation cosmological scenarios. Each involves the concept of the universal 'now' describing the whole universe at the same moment of time as recorded by local Earth clocks. Each involves special initial conditions for the creation of all stars in the universe so that their light arrives at Earth for the first time on Day 4. The days of creation are 24-hour Earth days and the rest of the universe is as young as Earth except for 3 days.

In conclusion Dennis makes a key observation:

"We conclude by briefly discussing possible objections of some of our key assumptions and showing that a relativist cannot consistently object to our assumptions based on the merely operationalist point of view that an absolute spacelike 'now' cannot be empirically determined."¹⁵

Since the concept of a universal 'now' representing a state of the universe at any moment in time cannot be rejected by any operational empirical consideration, we are free to choose. Based on the biblical account, where time advances, day after day, and events occur when they are observed, it would seem to be the most appropriate conclusion to state that a universal 'now' is the correct philosophical view to interpret the Bible, especially the Genesis creation narrative. We see the cosmos as it is now; we are not looking back into the past.

The past is gone forever. But just because we observe a 'mature' galaxy or star does not imply that it evolved from some simpler primordial form. The Genesis account does not indicate such a thing. What it does indicate is that all stars, and by extension galaxies, were created on Day 4. Thus they were created 'mature'. None are more than 6,000 years old. This can be understood from any one of these cosmologies discussed here (Lisle, Tenev *et al.* and Dennis). There is no

light travel-time from distant stars and so we observe the 'present' state of the universe at the moment we see it.

The language of the Bible is not that of the Einstein Synchrony Convention. That convention would mean, when viewing the cosmos, we are looking back into the past. But the language used employs the Anisotropic Synchrony Convention. That means we are looking at the present state of the galaxies in the cosmos.

Plain language bullet point summary

- The critical issue in all this is not which philosophy of time we accept (though that might influence our choices) *but which is the clock synchrony convention used in the biblical narrative in Genesis.*
- Historically most people held to the idea that what we observe in the universe (including all stars and galaxies) is the present state of the universe. When we look at galaxies we are not looking into the past. We see them in their present state. This is what we call a universal 'now'. (Universal means it includes the whole universe.) It implies that the light travel-time from the distant stars is instantaneous. This is consistent with Lisle's Anisotropic Synchrony Convention (ASC).
- In the past 200 years this viewpoint started to change; firstly among the scientific community and then the educated public. By the time the speed of light was measured and Einstein introduced his relativity theory, the universal 'now' was rejected. Einstein assumed a particular clock synchrony convention (ESC) which held that the speed of light was the same in all directions.
- The most popular philosophical viewpoint now holds that when we look at galaxies we are looking into the past. But the universe does not tell us which philosophical viewpoint is the correct one. It is also important to realise that whatever view one takes it is only an *assumption*.
- Before the last few hundred years and Einstein there was no biblical creationist starlight travel-time problem. In the 1600s, Sir Isaac Newton considered that the speed of light and gravity were instantaneous, i.e. that there was no delay between the source and the observer. Scientists believed in the universal 'now'.
- Only after the 17th century, when the speed of light was measured and Einstein's Special Relativity was promoted, was the universal 'now' replaced under a new philosophical assumption. This involved Einstein's choice of clock synchrony convention.
- Einstein's assumption created the starlight travel-time problem in a large universe for biblical creationists.
- By rejecting the ESC for interpreting the biblical text, and by assuming the ASC is what the Author used, we can easily explain starlight travel-time. There is no problem

because we are seeing the present state, not the past state, of all the universe.

- Above I presented the uniquely convergent outcomes of three separate creationist cosmologies. They are not exactly the same but essentially arrive at the same conclusion. This fact then argues for the universal ‘now’ as a simple approach in explaining that there is no light travel-time problem.
- No laws of physics are changed by assuming the ASC is the convention of the Bible. All laws of nature remain the same. There is no denial of modern physics, including relativity theory. In fact, this is all in keeping with modern physics.
- Different philosophical viewpoints on how we look at the universe have been discussed and debate on them continues. But the real question here is: What is the viewpoint that the Author of the Bible took in the written text?
- The plain language of the Bible argues that not only is Earth young (i.e. 6,000 years old) but the same can be said of the whole universe also.
- On Day 4, about 6,000 years ago, God created the whole universe, meaning all the stars and galaxies. He did it in such a way that the light from them all arrived at Earth on that Day 4. So what we see today in the universe is not millions or billions of years old but only about 6,000 years old.

Acknowledgment

I would like to thank Alex Williams and an anonymous reviewer for some valuable insights and suggestions.

References

1. Newton, R., Distant starlight and Genesis: conventions of time measurement, *J. Creation* 15(1):80–85, 2001.
2. Simultaneous by convention but not by any empirical method of measurement. It is assumed to be the case, or even defined that way.
3. Timestamped means the moment of the event is clocked or recorded by a clock. In the case of the ASC (a convention) all events occur when the light of the event is first seen. This is the normal everyday experience. When we see something happen we say it happened the moment we saw it.
4. Lisle, J.P., Anisotropic Synchrony Convention—a solution to the distant starlight problem, *Answers Research J.* 3:191–207, 2010.
5. Hartnett, J.G., The Anisotropic Synchrony Convention model as a solution to the creationist starlight-travel-time problem, *J. Creation* 25(3):56–62, 2011.
6. Only the two-way speed of light is measurable but that does not mean that one cannot choose the one-way speed as a consequence of one’s choice of a clock synchrony convention. See the following endnote.
7. Thus in any measurement of the speed of light, where a single clock is used and the beam is reflected from a mirror, the average speed for the round trip—out to the mirror and back to the source—is the measured speed c . This is called the two-way speed of light or the isotropic speed of light. If the incoming one-way speed of light is infinite then the outgoing speed must be $\frac{1}{2}c$ so that the average speed is c for any two-way measurement. The one-way speed cannot be measured.
8. See secular discussion in Wikipedia: One-way speed of light, en.wikipedia.org/wiki/One-way_speed_of_light, accessed 24 September 2018.
9. Lisle, J.P., *The Physics of Einstein*, Biblical Science Institute, subsection The epsilon equations, pp. 221–231, 2018.
10. Usually the choice of coordinate system is dictated by which is the most convenient to understand the physics. For the same reason a timing convention is chosen that best simplifies the equations describing the physics. Most physics in the textbooks is written in terms of the assumption that the speed of light is isotropic and observer independent (inertial reference frame). This is the Einstein Synchrony Convention or ESC.
11. Maxwell’s equations contain the propagation constant (usually represented by the parameter c) for electromagnetic radiation. Later this was identified as the speed of light. However Maxwell’s equations are derived in a closed system, where the speed of propagation is isotropic. Hence one would not expect c to represent anything but the two-way speed of light.
12. Lisle, J.P., *The Physics of Einstein*, Biblical Science Institute, pp. 240, 256, 2018.
13. Excerpted from Lisle quoted in Hartnett, J.G., Update on the ASC model and the one-way speed of light, bible-science-forum.com/2018/09/16/update-on-the-asc-model-and-the-one-way-speed-of-light/.
14. Tenev, T.G., Baumgardner, J., and Horstemeyer, M.F., A solution for the distant starlight problem using creation time coordinates; in: Whitmore, J.H. (Ed.), *Proceedings of the Eighth International Conference on Creationism*, Creation Science Fellowship, Pittsburgh, PA, pp. 82–94, 2018.
15. Dennis, P.W., Consistent young earth relativistic cosmology; in: Whitmore, J.H. (Ed.), *Proceedings of the Eighth International Conference on Creationism*, Creation Science Fellowship, Pittsburgh, PA, pp. 14–35, 2018.
16. Hartnett, J.G., Update on the ASC model and the one-way speed of light, bible-science-forum.com/2018/09/16/update-on-the-asc-model-and-the-one-way-speed-of-light/.
17. Hartnett, J.G., Cosmology’s fatal weakness—underdetermination, *J. Creation* 32(2):15–17, 2018.
18. Eternalism is a philosophical approach to the ontological nature of time, which takes the view that all existence in time is equally real, as opposed to presentism. For a brief discussion see: reviewonphilosophy.wordpress.com/2011/12/12/eternalism-vs-presentism/.
19. Calaprice, A. (Ed.), *The Expanded Quotable Einstein*, Princeton University Press, Princeton, p. 75, 2000.
20. Einstein, A., *Ideas and Opinions*, Modern Library edn, Random House, New York, p. 411, 1994.
21. As stated, most modern relativists would accept the eternalist philosophy, along with Einstein, where time is viewed as an illusion. But atheist physicist and cosmologist Lee Smolin believes that time is real and that the laws of physics do change. He and his co-author, Unger, suggest that the laws of physics evolve and hence for that to occur time must be real. See Hartnett, J.G., The universe and the reality of its creator, *J. Creation* 30(2):24–25, 2016.

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Critique of the latest evolutionary models of the beginning of life

Matthew Cserhati and Adrian Chira

A number of recent evolutionary models are considered and reviewed. The models contradict each other as to the origins of Eukaryotes, Archaea, and Bacteria. Finding a root for the tree of life containing these three domains has proven to be elusive. A hallmark of these theories is that cellular complexity came about suddenly, with subsequent genome reduction in many cellular lifeforms in the three domains. Some evolutionists even deny the existence of a tree of life or that evolution progresses from simple to complex. Yet, they are at a complete loss as to how complexity arose so fast and so early. A better explanation that more harmoniously fits the data is that these cellular lifeforms were created separately from one another, and form different kinds which may vary within bounds, according to creation theory.

In figure 1, we see one of the latest trees of life.¹ The tree is split into three main domains: Bacteria, Archaea, and Eukarya. Archaea was discovered as a separate domain by Carl Woese who constructed a phylogenetic tree based on the 16S rRNA.² The 16S rRNA molecule was chosen because it is ubiquitous, functionally constant, refractory to horizontal gene transfer (HGT), and it mutates very slowly.³ However, the choice of the 16S rRNA molecule was somewhat arbitrary, as other universal proteins exist which also could have been used, such as the 18S rRNA, or RNA polymerase subunits.⁴ The informational and operational proteins (involved in translation, transcription, and replication, and metabolism and biosynthesis, respectively) of both Eukarya and Archaea are more similar to each other than are those of Eukarya and Bacteria. Furthermore, Eukarya and Archaea share proteins that are either absent in Bacteria or have non-homologous proteins with the same function. Eukarya are also called synkaryotes (literally meaning ‘with a nucleus’) according to some theories. This contrasts with the akaryotes (literally meaning ‘without a nucleus’), which are understood to be the prokaryotes.⁵

There are presently a number of evolutionary theories which try to explain the origin of cell types from the three domains of life, but they all appear to be contradictory to some extent.^{6,7} According to one theory, Eukarya and Archaea are two distinct lineages that arose from a single common ancestor (the three-domain hypothesis).⁸ Another theory claims that the Archaea group together with Eukarya make up a single super-domain, ‘Arkarya’ (the two-domain hypothesis).⁸ However, Eukarya is really a subgroup of Archaea, and a sister group of the TACK superphylum (Thaumarcheota, Aigarcheota, Crenarcheota, and Korarcheota), with poor tree resolution. This poor resolution indicates that the supposed evolutionary origin of these groups is not clear-cut, and that instead they

could have been created separately. Moreover, Archaea is divided into two major phyla, the Crenarchaeota (including hyperthermophiles) and the Euryarchaeota (made up of different groups found in diverse environments and having various metabolic activities). These different groups of Archaea are fundamentally different in their metabolism. This alone indicates that these groups of organisms are distinct from one another without any evolutionary transitions between them.

According to yet another theory, the so-called eocyte hypothesis, Eukarya originated from an association between a crenarchaeote and a bacterium.⁸

On the tree shown in figure 1, six hypothetical organisms are featured which represent the last supposed common ancestors of these large domains or subdomains: LUCA, LBCA, LARCA, LACA, LECA, and FME (LBCA: last bacterial common ancestor; LACA: last archaeal common ancestor; LECA: last eukaryotic common ancestor; FME: first mitochondrial eukarya; LARCA: last arkarya common ancestor; LUCA: last universal common ancestor). The hypothetical existence of the FME implies a stage between itself and the LARCA, i.e. when eukaryotes had supposedly evolved but still did not have any energy-producing organelles like the mitochondrion.

The dashed cross-arrow from α -proteobacteria to the FME denotes endosymbiosis of such an organism with another eukaryotic ancestor, along with the transfer of genes from it into its genome. Another dashed line points to the endosymbiosis of cyanobacteria with Plantae, the resulting organisms becoming the forerunners of chloroplasts. It is interesting to note that the PVC superphylum is a separate group within Bacteria, and it is not the ancestor of the Eukarya, despite the presence of a number of similar proteins and organelles shared between the two groups. These proteins and organelles are only analogous, being similar in

how a bacterial cell could be transformed into a eukaryotic one. The process would involve rewriting its genetic code and drastically changing its gene regulation and cellular structure, all the while keeping each intermediate step viable throughout the hypothetical process of accelerated (and unobserved, therefore unverifiable) evolution. Added to these difficulties is the fact that LUCA had some ‘eukaryotic-like’ features,⁵ which hints at the early complexity of these hypothetical organisms, and signifies a qualitative leap from its non-eukaryotic ancestors.

It is also interesting to note that the presence or absence of certain proteins can be used as markers to distinguish between trees or sub-trees of each taxonomic group. For example, a hexameric replicative helicase, minichromosome maintenance complex, is used as a marker for the archaeal domain,¹⁶ whereas DNA gyrase is used as a marker in the sub-phylum I of the Euryarchaeota.¹⁷ Furthermore, and most importantly, no single protein can be used safely to reconstruct the supposed ‘path of life’ taken during evolution. Although the so-called ‘tree of life’ shows congruence in some places, it is only the case at shallower phylogenetic depths.¹⁸ This has led some to build composite trees based on the concatenation (linking in chains) of select protein sequences. However, there is a lack of correspondence between the composite tree and the trees derived from individual proteins.^{8,19} Furthermore, the more genes that are concatenated, the bigger the chance that genes involved in HGT are used.²⁰

A list of such universal gene/protein families is shown in table 1 (taken from Gribaldo *et al.*⁸ This list includes 35 COGS, which correspond to data sets analyzed by at least three of four groups, including Harris *et al.*,²¹ Ciccarelli *et al.*,²² Yutin *et al.*,²³ and Cox *et al.*,²⁴ and Foster *et al.*²⁵ It is interesting to note that 30 of these 35 proteins are involved in translation, ribosomal structure, and biogenesis, indicating that only a small part of all the global cellular functions are represented; thus giving a biased picture of the origin of the first cell. The problem with using universal proteins is that only a small number of genes are used to construct the tree of life. Thus, the tree of life becomes what some evolutionists aptly call ‘the tree of one percent’²⁶—a far cry from the universal tree of life envisioned by Darwin. This is similar to issues experienced with the geological column. It is fully continuous in only 0.4% of all of the earth’s surface.²⁷

If evolution were true, then there should not be so many problems with generating phylogenetic trees based on protein sequences. Every single universal protein should generate exactly the same tree without exception. Yet, there are many exceptions which contradict the general rule. In summary, phylogenomics of early life does not support one common tree and, consequently, does not support one common ancestor.

What is also striking about the tree of life is that the tempo of evolution was allegedly much faster in the eons leading up to the emergence of eukaryotes, after which it slowed down. Archaea, on the other hand, is an exception. This has been noted as follows by Patrick Forterre:

“... whilst progressively and randomly losing some of their eukaryotic features, except for one particular lineage of Lokiarchaeota that experienced a dramatic burst of accelerated evolution and was transformed into eukaryotes.”¹¹

However, such mechanisms for generating accelerated bursts of evolution have not yet been identified. These explanations are akin to the theory of punctuated equilibrium at a molecular level. Intermediate stages have never been found, so the actual proof of evolution is missing.

Early complexity and genome reduction

Both Archaea and Eukarya are thought to have undergone sudden appearance of complexity, with subsequent gene loss and simplification.^{28,29} For example, early-life evolutionists have proposed that the complete set of methanogenic enzymes suddenly appeared, and then were lost separately in Crenarchaeota and all non-methanogenic euryarchaeal lineages.³⁰ Some suggest that three main archaeal phyla (Crenarchaeota, Euryarchaeota, and Nanoarchaeota) should be built on comparative genomic studies. *Nanoarchaeum equitans* belongs to this latter phylum, and has a genome of a mere 490 Mb, and lacks one-third of all genes present in other archaeal genomes.^{30,31} This is significant, because if this species really is related to the other two Archaeal phyla, then it must have undergone significant genome reduction.

The complex origin of eukaryotes has its own issues. As even evolutionists admit, no intermediates have been found between prokaryotes and eukaryotes, and any similarities between these two types of cells are mainly based on analogy, and not descent by homology.¹⁰ The same appears to be the case between bacterial and archaeal cells.³² Since no primary amitochondrial eukaryotes are known, the appearance of the first organelles poses another problem. The mechanistic difficulty of one prokaryotic cell engulfing another is formidable, making symbiotic scenarios unrealistic.^{33,34}

Coupled with early cellular complexity is the widespread phenomenon of genome reduction. For example, according to evolutionary theory, mitochondria and chloroplasts have lost nearly all of their ancestral genes,³⁵ and hydrogenosomes and mitosomes have lost all of theirs. Bacterial genome decay is also a well-known fact, with free-living bacteria losing up to 95% of their genes during their transition to become obligate intracellular parasites.^{36,37} The idea of a progressive complexity being shown by species has now been replaced by what some evolutionists call ‘a drunkard’s walk’ model of evolution. Table 2 (after Wolf and Koonin³⁸) lists several

Table 1. List of 33 clusters of orthologous groups (COGs) which have been used as universal proteins by four references (from Harris *et al.*²¹, Ciccarelli *et al.*²², Yutin *et al.*²³, Cox *et al.*²⁴, and Foster *et al.*²⁵)

Name	Description	Function	No. of studies
COG0048	Ribosomal protein S12	Translation, ribosomal structure and biogenesis	4
COG0049	Ribosomal protein S7	Translation, ribosomal structure and biogenesis	4
COG0080	Ribosomal protein L11	Translation, ribosomal structure and biogenesis	4
COG0081	Ribosomal protein L1	Translation, ribosomal structure and biogenesis	4
COG0087	Ribosomal protein L3	Translation, ribosomal structure and biogenesis	4
COG0091	Ribosomal protein L22	Translation, ribosomal structure and biogenesis	4
COG0093	Ribosomal protein L14	Translation, ribosomal structure and biogenesis	4
COG0094	Ribosomal protein L5	Translation, ribosomal structure and biogenesis	4
COG0098	Ribosomal protein L5	Translation, ribosomal structure and biogenesis	4
COG0099	Ribosomal protein S13	Translation, ribosomal structure and biogenesis	4
COG0100	Ribosomal protein S11	Translation, ribosomal structure and biogenesis	4
COG0102	Ribosomal protein L13	Translation, ribosomal structure and biogenesis	4
COG0103	Ribosomal protein S9	Translation, ribosomal structure and biogenesis	4
COG0186	Ribosomal protein S17	Translation, ribosomal structure and biogenesis	4
COG0197	Ribosomal protein L16/L10AE	Translation, ribosomal structure and biogenesis	4
COG0201	Preprotein translocase subunit SecY	Intracellular trafficking, secretion, and vesicular transport	4
COG0256	Ribosomal protein L18	Translation, ribosomal structure and biogenesis	4
COG0016	Phenylalanyl-tRNA synthetase alpha subunit	Translation, ribosomal structure and biogenesis	3
COG0024	Methionine aminopeptidase	Translation, ribosomal structure and biogenesis	3
COG0085	DNA-directed RNA polymerase, beta subunit/ 140 kD subunit	Transcription	3
COG0086	DNA-directed RNA polymerase, beta' subunit/ 160 kD subunit	Transcription	3
COG0088	Ribosomal protein L4	Translation, ribosomal structure and biogenesis	3
COG0090	Ribosomal protein L2	Translation, ribosomal structure and biogenesis	3
COG0092	Ribosomal protein S3	Translation, ribosomal structure and biogenesis	3
COG0096	Ribosomal protein S8	Translation, ribosomal structure and biogenesis	3
COG0097	Ribosomal protein L6P/L9E	Translation, ribosomal structure and biogenesis	3
COG0184	Ribosomal protein S15P/S13E	Translation, ribosomal structure and biogenesis	3
COG0480	Translation elongation factor EF-G, a GTPase	Translation, ribosomal structure and biogenesis	3
COG0522	Ribosomal protein S4 or related protein	Translation, ribosomal structure and biogenesis	3
COG0532	Translation initiation factor IF-2, a GTPase	Translation, ribosomal structure and biogenesis	3
COG0533	tRNA A37 threonylcarbamoyltransferase TsaD	Translation, ribosomal structure and biogenesis	3
COG0541	Signal recognition particle GTPase	Intracellular trafficking, secretion, and vesicular transport	3
COG0552	Signal recognition particle GTPase	Intracellular trafficking, secretion, and vesicular transport	3

taxonomical groups as well as a characterization of their ancestor together with the kind of genome reduction that they allegedly experienced.

Genome reduction is so pervasive that Wolf and Koonin³⁸ posited the so-called biphasic model of genome evolution. This consists of two main phases, the first one being “genomic complexification at faster than exponential rate that is associated with stages of major innovation”. The first phase is followed by a second phase of “genome simplification associated with the gradual loss of genetic material”.³⁸ (An example is the appearance of introns which are considered to be more ancestral and supposedly underwent ‘streamlining’ that resulted in their current form.²⁹) However, nothing much is said regarding the cause and the mechanism of rapid genomic complexification of the first phase. Evolutionists are forced to speculate and invoke a first phase in order to escape the clear implication of the special creation of such cellular complexity early on.

According to other theories, 2,500 genes existed in the genome of ancestral archaea, which is *even larger* than the

genomes of most extant archaea!³⁹ Csűrös and Miklós²⁸ also estimate, based on known gene families in 28 archaeal genomes, that early archaeal genomes were as complex as typical modern ones, and that the genome of LACA had approximately slightly more than 2,000 gene families. This means that the genomes of archaea either remained at the same level of complexity, or underwent genome reduction. This is just the opposite of the increasing complexity that evolution posits.

Baraminology studies on Archaea

Despite a ‘deluge of genomic data’, no resolution has yet been reached concerning the problem of the origin of different basic cell types.⁸ Many contradicting theories still exist as to how Bacteria, Archaea and Eukarya arose. The various genes studied also give contradictory tree topographies. Moreover, the last common ancestors of these cell types have never been identified or characterized. Thus,

Table 2. The extent and end result of genome reduction in a number of different taxonomic groups (after table 1 of Wolf and Koonin³⁸, with further references for each group in that paper)

Taxa	Depth of evolutionary reconstruction	Subject of evolutionary reconstruction	Outcome
Mitochondria	Proto-mitochondrial (alpha-proteo-bacterial) endosymbiosis, presumably, last common ancestor of eukaryotes	Genes	Deep reduction, to the point of genome elimination in anaerobic protists containing hydrogenosomes or mitosomes.
<i>Lactobacillales</i>	Last common ancestor of bacilli	Gene families	Complex ancestor; dominance of the reduction mode in all lineages
<i>Anoxybacillus flavithermus</i>	Last common ancestor of Firmicutes	Gene families	Ancestral complexification, then reduction
<i>Rickettsia</i>	Last common ancestor (“mother”) of rickettsia	Genes	Complex ancestor, dominance of the reduction mode in all lineages
Cyanobacteria including chloroplasts	Last common ancestor of cyanobacteria	Genes	Complex ancestor, complexification in some lineages, reduction in other lineages, ultimate reduction in chloroplasts
Archaea	Last archaeal common ancestor	Gene families	Moderately complex ancestor, ancestral complexification in some lineages, more recent dominance of genome reduction in all lineages
Eukaryotes	Last eukaryotic common ancestor	Protein domain families	Complex ancestor, reduction of the domain repertoire in most lineages, expansion only in multicellular organisms
Eukaryotes	Last common ancestor of eukaryotes	Introns	Complex early ancestors, mostly reductive evolution, complexification in some, primarily multicellular lineages
Microsporidia	Last common ancestor of microsporidia	Genes	Complex ancestor, deep reduction

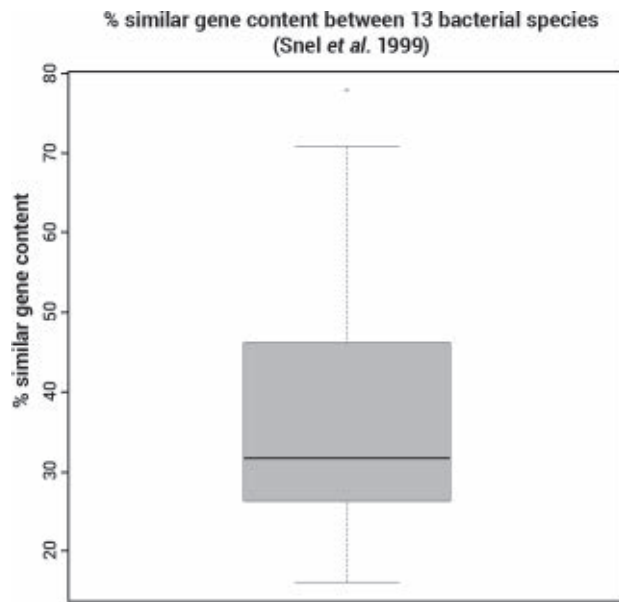


Figure 2. Boxplot of gene content similarity between 13 bacterial species from Snel *et al.*⁴¹ All species pairs had a mean gene content similarity of 36.7%. The outlier shown at the very top represents the gene content similarity between *Escherichia coli* and *Haemophilus influenzae*, which ran at 77.8%.

the idea of the special creation of different cell types presents itself as a viable scientific alternative.

Baraminology studies have been performed that identified eight putative archaeal baramins representing 168 species, based on common genes that are involved in basic metabolic processes.⁴⁰ Other approaches have been carried out to identify phylogenetic relationships between species based

on the presence/absence of particular genes. These studies included only a small number of species (11 or 13) (as opposed to the baraminology study based on 168 species), and demonstrated high, statistically significant, similarity among species within a baramin in contrast to species between different baramins.^{40–42}

Snel *et al.*⁴¹ studied 13 bacterial species and found that common genes between all species pairs was spread out, with an average gene content similarity of 36.7% and a median similarity of 31.7% (figure 2). This trend implies that all these species likely belong to different baramins. In contrast, in figures 3a and 3b, we can see a swarm plot of the gene content similarity values in the baraminology study between eight archaeal baramins. They clearly show a smaller set of high values at the top for species pairs within a baramin, as opposed to the great majority of similarity values between species from different baramins at the bottom. Figure 3b does not show this tendency since the species do not clearly fall within a single holobaramin.

Conclusion

All things considered, evolutionary hypotheses of the origins of life are complicated and contradictory. Lifeforms clearly separate well into three major, disjunct domains. Early complexity and genomic reduction are widespread, which contradicts evolution. The simplest and most straightforward explanation of the data is that these lifeforms came into existence independently from each other, namely that they were created in distinct ‘kinds’.

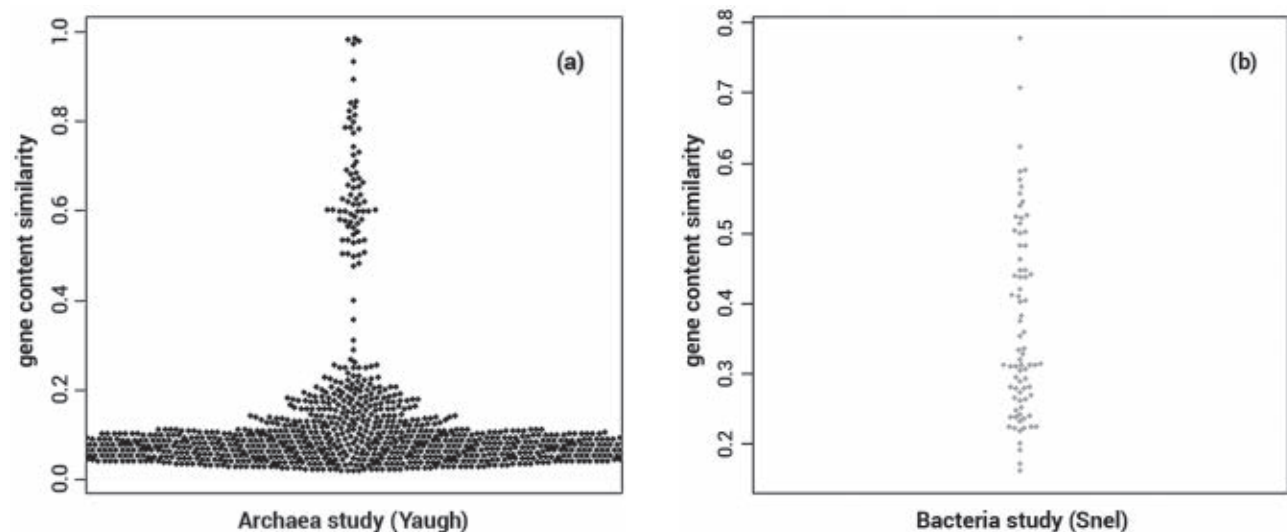


Figure 3a and 3b. Bee swarm plots of gene content similarity values from the studies of Yaugh⁴¹ and Snel *et al.*⁴¹. In Yaugh's study (a) it is observed that a smaller number of higher gene content similarity values exist among species coming from the same holobaramin, with many more smaller gene content similarity values at the bottom between species from different holobaramins. In Snel *et al.*'s study (b), no such tendency is observed on account of the smaller number of species involved as well as the species not coming from the same holobaramin.

Materials and methods

Figure 1 was made in PowerPoint and inspired by the work of Forterre¹. Figures 1, 2, 3a, and 3b were made in R version 3.4.3. using the boxplot and beeswarm commands.

References

- Forterre, P., The universal tree of life: an update, *Front Microbiol.* **21**(6):717, 2015.
- Woese, C.R., Bacterial evolution, *Microbiol Rev.* **51**(2):221–271, 1987.
- Woese, C.R., Interpreting the universal phylogenetic tree, *PNAS* **97**(15):8392–8396, 2000.
- Koonin, E.V. and Wolf, Y.I., Evolution of microbes and viruses: a paradigm shift in evolutionary biology? *Front Cell Infect Microbiol.* **2**:119, 2012.
- Forterre, P., The common ancestor of archaea and eukarya was not an archaeon, *Archaea* **2013**:372396, 2013.
- Glansdorff, N., Xu, Y., and Labeledan, B., The last universal common ancestor: emergence, constitution and genetic legacy of an elusive forerunner, *Biol Direct.* **3**:29, 2008.
- Robertson, M.P. and Joyce, G.F., The origins of the RNA world, *Cold Spring Harb Perspect Biol.* **4**(5), 2012.
- Gribaldo, S., Poole, A.M., Daubin, V., Forterre, P., and Brochier-Armanet, C., The origin of eukaryotes and their relationship with the Archaea: are we at a phylogenomic impasse? *Nat. Rev. Microbiol.* **8**(10):743–752, 2010.
- McInerney, J.O., Martin, W.F., Koonin, E.V. *et al.*, Planktomycetes and eukaryotes: a case of analogy not homology, *Bioessays* **33**:810–817, 2011.
- O'Micks, J., Molecular structures shared by prokaryotes and eukaryotes show signs of only analogy and not homology, *ARJ* **9**(2016):284–292, 2016.
- Raoult, D., There is no such thing as a tree of life (and of course viruses are out!), *Nat. Rev. Microbiol.* **7**:615, 2009.
- Hecker, A., Leulliot, N., Gadelle, D. *et al.*, An archaeal orthologue of the universal protein Kae1 is an iron metalloprotein which exhibits atypical DNA-binding properties and apurinic-endonuclease activity in vitro, *Nucleic Acids Res.* **35**(18):6042–6051, 2007.
- Forterre, P.A., A new fusion hypothesis for the origin of Eukarya: better than previous ones, but probably also wrong, *Res. Microbiol.* **162**(1):77–91, 2011.
- Woese, C.R., Kandler, O., and Wheelis, M.L., Towards a natural system of organisms: proposal for the domains Archaea, Bacteria, and Eucarya, *PNAS* **87**(12):4576–4579, 1990.
- Cserhati, M. and Shipton, W., The irreducibly complex ribosome is a unique creation in the three domains of life, *J. Creation* **31**(2):94–102, 2017.
- Krupovic, M., Gribaldo, S., Bamford, D.H., and Forterre, P., The evolutionary history of archaeal MCM helicases: a case study of vertical evolution combined with hitchhiking of mobile genetic elements, *Mol. Biol. Evol.* **27**(12):2716–2732, 2010.
- Raymann, K., Forterre, P., Brochier-Armanet, C., and Gribaldo, S., Global phylogenomic analysis disentangles the complex evolutionary history of DNA replication in archaea, *Genome Biol. Evol.* **6**(1):192–212, 2014.
- Puigbò, P., Wolf, Y.I., and Koonin, E.V., Genome-wide comparative analysis of phylogenetic trees: the prokaryotic forest of life, *Methods Mol. Biol.* **856**:53–79, 2012.
- Thiergart, T., Landan, G., and Martin, W.F., Concatenated alignments and the case of the disappearing tree, *BMC Evol. Biol.* **14**:266, 2014.
- Lasek-Nesselquist, E. and Gogarten, J.P., The effects of model choice and mitigating bias on the ribosomal tree of life, *Mol. Phylogenet Evol.* **69**(1):17–38, 2013.
- Harris, J.K., Kelley, S.T., Spiegelman, G.B., and Pace, N.R., The genetic core of the universal ancestor, *Genome Res.* **13**:407–412, 2003.
- Ciccarelli, F.D., Doerks, T., von Mering, C., Creevey, C.J., Snel, B., and Bork, P., Toward automatic reconstruction of a highly resolved tree of life, *Science* **311**(5765):1283–1287, 2016.
- Yutin, N., Makarova, K.S., Mekhedov, S.L., Wolf, Y.I., and Koonin, E.V., The deep archaeal roots of eukaryotes, *Mol. Biol. Evol.* **25**:1619–1630, 2008.
- Cox, C.J., Foster, P.G., Hirt, R.P., Harris, S.R., and Embley, T.M., The archaeobacterial origin of eukaryotes, *PNAS* **105**:20356–20361, 2008.
- Foster, P.G., Cox, C.J., and Embley, T.M., The primary divisions of life: a phylogenomic approach employing composition-heterogeneous methods, *Philos. Trans. R. Soc. Lond. B Biol. Sci.* **364**:2197–2207, 2009.
- Dagan, T. and Martin, W., The tree of one percent, *Genome Biol.* **7**(10):118, 2006.
- Austin, S.A., Ten misconceptions about the geologic column, *ICR Impact*, No. 137, 1984.
- Csurös, M. and Miklós, I., Streamlining and large ancestral genomes in Archaea inferred with a phylogenetic birth-and-death model, *Mol. Biol. Evol.* **26**(9):2087–2095, 2009.
- Mariscal, C. and Doolittle, W.F., Eukaryotes first: how could that be? *Philos. Trans. R. Soc. Lond. B Biol. Sci.* **370**(1678): 20140322, 2015.
- Waters, E., Hohn, M.J., Ahel, I., Graham, D.E., Adams, M.D., Barnstead, M., *et al.*, The genome of Nanoarchaeum equitans: insights into early archaeal evolution and derived parasitism, *PNAS* **100**(22):12984–12988, 2003.
- Gribaldo, S., Brochier-Armanet, C., The origin and evolution of Archaea: a state of the art, *Philos Trans R Soc Lond B Biol Sci.* **361**(1470):1007–1022, 2006.
- Koonin, E.V. Origin of eukaryotes from within archaea, archaeal eukaryome and bursts of gene gain: eukaryogenesis just made easier? *Philos Trans R Soc Lond B Biol Sci.* **370**(1678):20140333, 2015.
- Poole, A. and Penny, D., Eukaryote evolution: engulfed by speculation, *Nature* **44**:913, 2007a.
- Poole, A.M. and Penny, D., Evaluating hypotheses for the origin of eukaryotes, *Bioessays* **29**:74–84, 2007.
- Kurland, C.G., Collins, L.J., and Penny, D., Genomics and the irreducible nature of eukaryote cells, *Science* **312**:1011–1014, 2006.
- McCutcheon, J.P. and Moran, N.A., Extreme genome reduction in symbiotic bacteria, *Nat. Rev. Microbiol.* **10**:13–26, 2012.
- O'Micks, J., Bacterial genome decay from a baraminological viewpoint, *J. Creation* **29**(2):122–130, 2015.
- Wolf, Y.I. and Koonin, E.V., Genome reduction as the dominant mode of evolution, *Bioassays* **35**:829–837, 2013.
- Wolf, Y.I., Makarova, K.S., Yutin, N., and Koonin, E.V. Updated clusters of orthologous genes for Archaea: a complex ancestor of the Archaea and the byways of horizontal gene transfer, *Biol. Direct.* **14**(7):46, 2012.
- Yaugh, A., Baraminological analysis of a set of Archaea species based on genomic data, *Creation Research Society Quarterly* **53**:140–154, 2016.
- Snel, B., Bork, P., and Huynen, M.A., Genome phylogeny based on gene content, *Nat. Genet.* **21**(1):108–110, 1999.
- Fitz-Gibbon, S.T. and House, C.H., Whole genome-based phylogenetic analysis of free-living microorganisms, *Nucleic Acids Res.* **27**(21):4218–4222, 1999.

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Deep time in 18th-century France—part 1: a developing belief

Andrew Sibley

This paper considers the rise of belief in deep time in late 17th- and 18th-century France through the writings of Fontenelle, de Maillet, Comte de Buffon, and Voltaire. Evidence for the biblical Flood was rejected in favour of belief in millions of years of change by these men. Although the first three believed they were working within Descartes' scientific framework, it is apparent that there were many non-scientific factors at work: a vivid imagination, an interest in Eastern religions, and a willingness to misrepresent facts through deliberate deception. The Cartesian methodology, which is essentially methodological naturalism, also led to a perverse situation: the obvious candidate to account for the flood evidence, the Genesis Flood, was not allowed into the discussion because it was part of a religious text. Leclerc (Comte de Buffon) proposed a purely tranquil Flood, while Voltaire thought even acknowledging the fossil evidence publicly gave too much credence to Flood proponents. This paper offers possible reasons for their seeming desire to undermine Scripture, and points to the importance of upholding the integrity of the Genesis account as part of the Reformation.

Belief in deep time and an evolutionary process grew in late 17th-century and 18th-century France. There were a number of reasons for this: growing religious struggles, political unrest, and interest in non-Christian religions from ancient Greece, Egypt, and the Indian Sub-continent. During the middle of the 18th century there was also growing agitation for revolution, but suppression by the powers of State and Church only encouraged the revolution. Undermining the scriptural account of creation and the Flood arguably became part of the process of undermining the existing order, although that may not have been the initial or full motivation. In the 17th century the struggle between Protestantism and Catholicism over Church authority was at its height in Europe, and the Jesuits were central to that struggle into the 18th century. Following the work of the Jesuit-trained Descartes, an excessive skepticism in the name of reason was directed towards knowledge gained through Scripture, although with far less skepticism directed towards beliefs from eastern religions or the human imagination.

This study will look at a number of French philosophers of science, especially Fontenelle, de Maillet, Comte de Buffon, and Voltaire, and consider their endeavours to develop belief in deep time (figure 1). It becomes clear that there was willingness to use excessive speculation and sometimes deceit to fulfill their goals. Initially they sought to separate science from religious authority through the application of Cartesian philosophy. But de Maillet attempted to establish belief in billions of years of change through appeals to Hinduism and human speculation. A separate second part to this paper will look at evidence that Lyell and Darwin were influenced by the work of the French Enlightenment and used similar methodology to undermine the traditional Christian establishment in Britain.

Bernard De Fontenelle

Bernard de Fontenelle's (1657–1757) position at the Royal Academy of Sciences in Paris influenced the development of geological science in France through the early 18th century (figure 2). Fontenelle, who was trained by Jesuits at the Collège de Bourbon, wrote a book in 1686 that was arguably a work of science fiction, entitled *Conversations on the Plurality of Worlds* (*Entretiens sur la Pluralité des Mondes*). This was in the form of a dialogue between two people and discussed space travel and the possibility of life on the moon and other planets. It also introduced consideration of developments over long periods of time, and, as Stott suggests, opened up the French imagination and ideas for a century thereafter.¹ The purpose was officially concerned with the education of ordinary people by expounding the latest ideas of science, particularly in terms of heliocentrism. Through the dialogue he spoke of nature effecting changes very gradually over very long periods of time.

“Ought we to assert that what has lasted a hundred thousand times longer than we, must last for ever? No, ages on ages of our duration would scarcely be any indication of immortality. ... True, I replied; nature does nothing abruptly, her method is to effect every alteration by such gentle graduations that it is scarcely perceptible to us.”²

By writing it in the form of science fiction he could avoid the charge of heresy. In the Preface he spoke of the influence of Cicero, and that if challenged by the Catholic authorities on the suggestion that he believed men lived on the moon he would deny that they were men.

While being careful to not fully dismiss Scripture, probably out of fear of religious authority and an

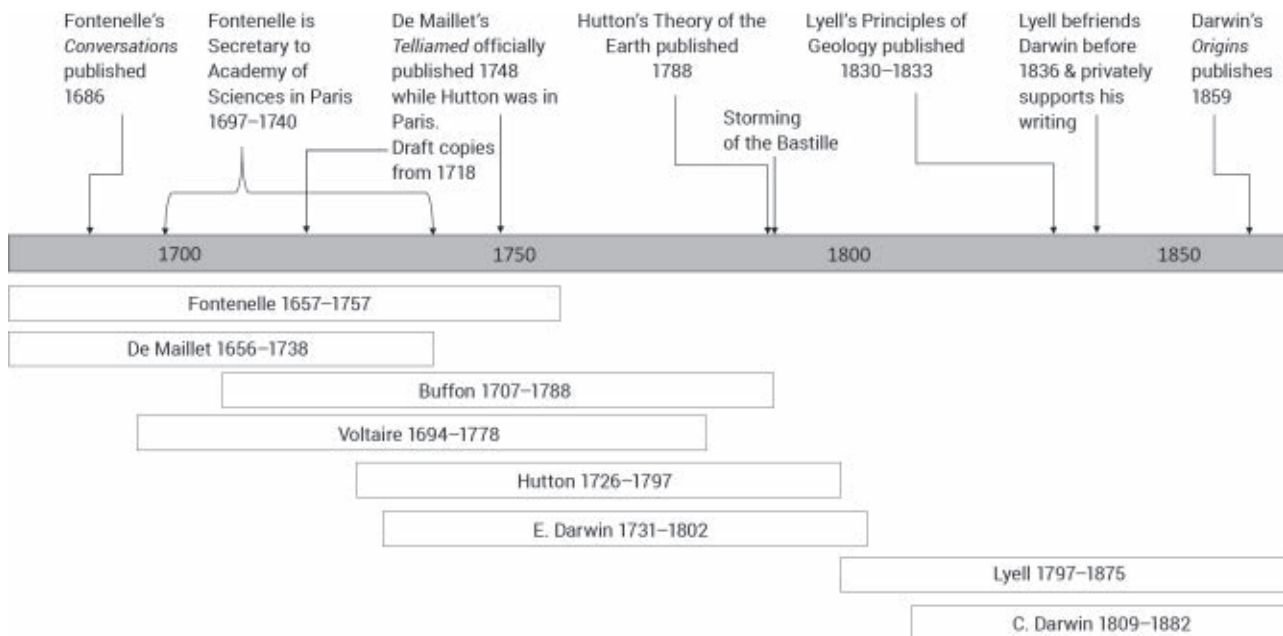


Figure 1. Timeline from Fontenelle to Darwin

unwillingness to make enemies, his approach cast doubt on other ancient texts, which he thought offered myths and not facts. For instance, he wrote *Of the Origin of Fables* (probably written in 1684, published 1724), in which he commented on the “ignorance of the first men”. However, he was careful not to undermine the Hebrew writings, commenting that “It is for this reason that there are no peoples whose history does not begin in fables, except the chosen people, among whom a particular care on the part of providence has preserved truth.”³ But in later years he spoke of the Noachic Flood in terms of it being merely hypothetical.⁴ While Fontenelle didn’t fully reject the Flood of Noah, he neutered its ability to explain the fossil evidence, and supported naturalistic explanations that extended history beyond the biblical timeframe.

Science and faith were separated in Fontenelle’s work along the lines set out by René Descartes, an approach which also appears in modern methodological naturalism. Descartes had developed a philosophy with doubt and skepticism at its core, especially as it relates to ancient or divine authority, and instead made mankind the arbiter of scientific truth. Although he was a self-confessed Catholic, his God was closer to the absentee landlord idea of later deism.⁵ From this it followed that science should be pursued without regard for the statements of religious texts; only reason and studies in nature were allowed. Descartes’ ideas on geology were published in 1644 in his *Principles of Philosophy* in which he envisioned the activity of underground air, water, and fire on smooth layers to shape the land surface through tectonic collapse and volcanic uplift. All of these he thought were explainable by natural processes.

Rappaport traces the subterfuge in Fontenelle’s work following his establishment as secretary within the Academy of Sciences in Paris in 1697, a position held until 1740. This gave him the opportunity to offer his own résumé in the *Histoire*, a shortened synopsis of the Academy’s *Mémoires*.⁶ His official task was to write a summary of the most noteworthy or remarkable research from published *Mémoires* papers, or summaries of unpublished papers, or comment on other correspondence. But, in reality, his summaries veered away from fully reflecting that research. Instead, they often reflected his own view regarding the nature of the fossil record and Earth history. He wrote in the Preface of the first publication, “we even took care on occasions of sowing our own clarifications to facilitate the



Figure 2. Bernard Le Bouyer de Fontenelle. He was secretary of the Royal Academy of Sciences in Paris for over 40 years. Portrait by Nicolas de Largillière, 18th century.

reading of the *Mémoires* (my translation)”.⁷ Through such clarifications, he used the occasion to try and persuade French academic society that an ancient history of the world could be arrived at through studies of nature with very little regard for belief in Noah’s Flood. There was only a weak commitment in 1708 to accept that the Flood might have explanatory ability for those fossils “which are in places where no other accident can have transported them, and where we cannot believe that there has ever been water since that time (my translation)”.⁸

He also subtly misrepresented the work of other early geologists in Europe: for instance, of Steno, Woodward, and Burnet, suggesting that such scientists were really following a Cartesian philosophical framework. “Descartes ... is the first to have thought of mechanically explaining the formation of the Earth, then Steno, Burnet, Woodward ...”⁹ But that was not really an accurate reflection of their work since the latter authors indicated that they had a desire to harmonize the evidence with the testimony of Scripture.¹⁰ The most direct contact Fontenelle had with Steno, Burnet, and Woodward came via correspondence with Leibniz in 1706.¹¹ Leibniz had previously discussed fossils with Steno and Woodward and held to the reality of the Flood of Noah. This he thought was explicable through mechanical processes without denying divine causation.¹² He proposed that some creatures may have fallen to the bottom of lakes and so become encrusted by sediment, and that a universal receding ocean might have left fossil fish in caves high on mountain tops. But Fontenelle was less inclined to hold to a literal reading of Scripture, and the following year (1707) considered the possibility of coastal erosion at one location covering a period of 12,000 years.¹³

Papers by Antoine de Jussieu and René Réaumur

In the years 1718 and 1720 Fontenelle was given renewed opportunity to extend and develop his theory of a universal ocean without recourse to the Noachic Flood. Firstly, through the writing of Antoine de Jussieu’s observations of fossil plants in Lyonnais of 1718, and later in 1720 with René Réaumur’s study of sedimentary layers around the town of Tours in France with its mass of broken shells. Jussieu recorded the findings of fossil plants in Lyonnais among marine shells and noted that the plants did not resemble local flora, although they were similar to those found elsewhere in the world, specifically from India and the West Indies. The volumes of botanical evidence, he suggested, composed “the oldest library of the world”.¹⁴ He wondered how such material might have been transported to be buried in France, but the leaves were considered to be laid too neatly to be attributable to such a violent event as the Noachic cataclysm. There was, however, recognition in Jussieu’s paper that much of the world was once covered by a global ocean, but that the water either gradually or suddenly retreated.¹⁵

Réaumur discovered that shell fragments were so profuse that the farmers collected the shells, ground them down, and used them as soil fertilizer. In his paper to the Paris Academy of Sciences in 1720 *Remarks on some fossil shells of Touraine and their uses* Réaumur noted that the Falun layers consisted of around seven metres of well-distributed sediment, consisting of complete and broken shells. He proposed that instead of this being attributable to a single watery event lasting no more than a year, the thickness of the sediment could mean that it was evidence of an inlet of the sea and that the layers would have taken a long time to be laid down. For Réaumur the shells were of biological origin, but he questioned the idea that a single event might potentially leave such evidence. He suggested from evidence of current coastal changes that it would have required thirty to forty centuries for the sea to retreat to its present position thirty-six leagues (about 160 km) from the present coastline. However, an alternative proposal, offered by Réaumur, allowed for sudden vertical adjustments in the landmass for sea creatures fossilized in sediments so far from the coast. Unlike Woodward and Steno, Réaumur was not concerned with defending Scripture, even though he accepted the evidence that fossils were once living organisms.

The work of Réaumur and Jussieu led Fontenelle to further speculate that life on Earth had long pre-existed the arrival of mankind, and that successive floods, or ‘revolutions’, over lengthy periods of time might have transported material to Europe. To explain the evidence in the Touraine a globally receding ocean was considered necessary, but one that receded erratically with successive floods inundating the landmass. And yet arbitrarily none of these floods were allowed to be the one recorded in Genesis, which was considered a single violent event; ironically, it was too violent to account for the botanical evidence, and yet unremarkable for his scientific model. The revolutions that he envisaged covered longer periods of time than those recorded in the Bible:

“... the changes which we know since the time of the Histories, or the Fables which have something historical, are in truth considerably small, but it gives us a place to easily imagine those which longer periods could lead to (my translation).”¹⁶

Fontenelle was however careful to allow that the evidence for the Flood was perhaps somewhere else, “It effectively remains that on the Earth there are many footprints of the universal Flood reported by Holy Scripture (my translation).”¹⁷

Benoît de Maillet

There were several other authors who attempted to undermine biblical authority, but they advanced their work clandestinely because of fear of the consequences. The most notable of these authors was Benoît de Maillet (1656–1738),

who was well connected in French society (figure 3). Through his work as a French diplomat he had opportunity to travel widely in the Middle East and studied the Egyptian pyramids, ancient pagan philosophies and Eastern religions. Officially he reported to the king's ministers, but secretly worked to undermine acceptance of the biblical Flood arguing that the earth was of the order of two billion years old.¹⁸ He had opportunity to read Fontenelle's *Conversations* and other scientific papers while travelling, and later Fontenelle offered him encouragement to expand the work. But while Fontenelle had argued along Cartesian lines in his *Histoires*, de Maillet also appealed to the beliefs of Hinduism to justify his estimation of the antiquity of the earth.

The major work of de Maillet was presented for publication in Paris in 1735, although draft copies had circulated in Paris as early as 1718 with gossip concerning its contents spreading through Parisian society.¹⁹ It was finally published in the French language in 1748 by a printer in Holland. This was several years after his death.²⁰ This publication was under a thinly veiled pseudonym as *Telliamed, or Conversations Between an Indian Philosopher and a French Missionary on the Diminution of the Sea, and the Origin of Men and Animals*.²¹ Telliamed is of course a simple reversal of his name, and this character was given the task of presenting the author's more radical views.²²

The Jesuit priest Abbé Jean Baptiste le Mascrier edited the original manuscript before publication in order to make



BENOÎT DE MAILLET *Gentilhomme Lorrain, Consul Général du Roi en Egypte et en Turquie, depuis l'ordonnance des Echelles du Levant et de Barbarie; et nommé par Sa Majesté au grade de son Envoyé vers le Roi d'Ethiopie; Auteur des Mémoires sur l'Egypte et sur l'Ethiopie.*

Figure 3. Benoît de Maillet, *Description de l'Egypte*, Paris, painting by Étienne and Edme Jeaurat 1735. His edited work *Telliamed* ... was published after his death in 1748.

it more harmonious with Catholic doctrine, with the overt claims for billions of years withheld. It was finally published in the form of a semi-fictional dialogue, and although it still caused controversy despite the editing it proved to be a bestseller with influence extending across Europe. The work had presented the days of Genesis as long periods of time, but contended for an early theory of evolution where marine animals gradually turned into terrestrial forms as the sea receded. Flying fish became birds, and mermen and mermaids were said to have evolved into men and women. Those who opposed his views were considered obstinate for reasons of Christian conviction, but his own beliefs had developed from Eastern mysticism and pantheism.²³

At face value he presented an early uniformitarian theory, appealing to gradual changes in the earth. The age-related claims were determined from calculations of the rate at which water was receding into the earth via vortices. Through measurements over decades he estimated this to be at a rate of 3 inches (7.6 cm) per century, or 3 feet (91 cm) per 1,000 years. In le Mascrier's edited version we read; "Now according to this Estimation, the Sea ... diminished six feet in two thousand Years" and "for there certainly were before, in Places four or five hundred or a thousand Fathoms [one fathom is 6 feet, 1.83 m] above her present Surface, Habitations and Ports, frequented as ours are at present."²⁴ He ignored isostatic or vertical changes in the earth's surface, knew nothing of plate tectonics, and overlooked places where the sea had risen relative to the land. But if these estimates are multiplied the period is 2 to 2.4 Ma for the length of human civilization. And if his estimate for the diminution of the sea were extrapolated to account for the height of Mount Everest we would have around 11.7 Ma. He comments further:

"... this Globe was neither habitable, not inhabited till many Ages after the Appearance of our first Grounds; that Navigation ... [was] not known till long after the Existence of Men; and that after a Beginning ... the Progress of Navigation has been so slow, that from that Time till the Building of the Ship found in Sweden [allegedly in a mine 600 feet (183 m) underground], we may reckon an incredible Number of Years, and perhaps the half of the Age of the Earth."²⁵

In unpublished versions he was speaking in terms of 2 Ga for the age of the earth, which correlated with the Hindu view of the world.²⁶ The Hindu cyclical periods were first expounded in the Puranic literature that asserted that the universe undergoes a continual cycle of creation, destruction, and recreation. The 12-hour day of Brahma was said to last for 4.32 Ga, during which period the god Brahma, who governs the universe, is awake, followed by a night of similar length. It would seem that broad correlation in his estimates with the Hindu age of the earth was not coincidental.

There were a number of other authors who argued for some form of evolution in 18th-century France, including

Comte de Buffon, Diderot, Lamarck, and Geoffroy St Hilaire, and his son Isodore. Diderot wrote an anonymous *Letter on the Blind* (*Lettres sur les Aveugles*), published in 1749. In this work he envisioned nature throwing up shapeless mutant monsters over millions of years, with destructive revolutions overturning existing orders followed by the establishment of new orders. There was no God in Diderot's system of nature, only mindless accidents. But despite attempts at anonymity, it was clear who the author was, and this led to his brief imprisonment in 1749. Upon release Diderot continued writing his *Encyclopédie* arguing that "Nature advances by nuanced and often imperceptible degrees".²⁷

Georges-Louis Leclerc—Comte de Buffon

According to Rappaport, Georges-Louis Leclerc, known as Comte de Buffon (1707–1788), also read Fontenelle's *Histoire* but apparently not the *Mémoires*, and this influence worked its way into Buffon's major works on natural history and a theory of the earth. In effect, then, Buffon was promoting and extending the ideas of Fontenelle, and he continued to separate the fossil evidence from the biblical Flood along Cartesian lines. Buffon was elected to the Paris-based Royal Academy of Sciences in 1734 and five years later became a director to the Royal Garden, *Le Jardin du Roi* (figure 4). From these positions he published thirty-six volumes under the title *Histoire Naturelle* between 1749 and 1789, in which he set out a theory of the earth and expressed affinity for the idea of a receding ocean (several were published after his death).

Buffon did not reject the Flood of Noah openly, but he could not accept that the Deluge had laid down the fossil shells in orderly strata if Burnet's and Woodward's accounts were true. He wrote, "it would have jumbled them together without any order or regularity".²⁸ Following critiques of these English authors' works, he developed his own theory of the earth and denied that there was any significant evidence for the Flood. Instead, he saw it as a supernatural event to chastise mankind, with the strata and trees and plants undisturbed in a rather tranquil event.

"We ought also to look on the universal deluge as a super-natural means of which the Almighty made use for the chastisement of mankind, and not as an effect of a natural cause. ... we see clearly by the scripture that it was designed for the destruction of men and animals, and that it did not in any mode change the earth, since after the retreat of the waters, the mountains and even the trees were in their place, and the surface of the earth was proper to receive culture, and produce vines and fruit."²⁹

He was, however, criticized by the faculty of Sorbonne in January 1751 because his writing was considered to be in opposition to the creed of the Church. Of particular offence was Buffon's assertion that present mountains and valleys

were formed by a receding ocean, or successive inundations of the sea, and not formed at creation. Buffon 'repented' of his speculation in public but had the support of the king and continued to develop his ideas in private.³⁰ Later, through experimentation on the cooling rates of different metals such as iron, he argued that the earth was of the order of 75,000 years old. This was presented in *Epochs of Nature* in 1778, although periods of 3 to 10 Ma were later found in unpublished drafts.³¹ But as a small concession to Scripture he allowed that the earth had gone through seven epochs of time, albeit long ages.³²

Although Buffon did not openly push the age of the earth at the time, there was a desire that the biblical Flood would fade in French society, for instance in the writing of Voltaire (discussed below). Buffon's volumes also influenced Georges Cuvier, who opposed evolution, but argued for a series of destructive catastrophes upon the earth, with the last one the account given by Moses. Through the late 18th century there was further interest in appeals to volcanism to describe the history of the world: for instance, in the work of Jean-Louis Soulavie (1752–1813), who elaborated further on Buffon's *Epochs*, and Francois-Dominique de Reynaud de Montlosier (1755–1838), who wrote in 1789 about the volcanoes of Auvergne in *Volcans d'Auvergne*, as had Nicolas Desmarest during the 1750s, '60s, and '70s.³³

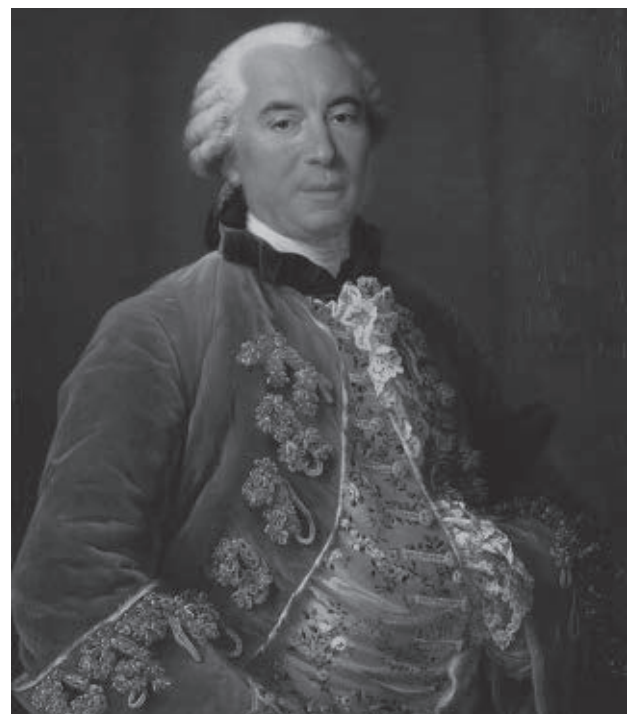


Figure 4. Georges-Louis Leclerc, Comte de Buffon, painting by François-Hubert Drouais, 1753. Buffon's *Theory of the Earth* extended the geological time-frame to tens of thousands of years.

François-Marie Arouet—Voltaire

While Fontenelle and followers reinforced the study of geology along Cartesian lines, and influenced many French scholars to reject the biblical time-scale, another Enlightenment philosopher was apparently sceptical of both the geological evidence and Scripture. The Jesuit-trained student Voltaire (François-Marie Arouet, 1694–1778) adopted some of the ideas of the 17th-century Jesuit Athanasius Kircher, having studied *Mondus subterraneus* at Collège Louis-le-Grand in Paris. This gave Voltaire awareness of Kircher's inorganic theory of fossil formation, where spontaneous generation through some esoteric power in nature was considered sufficient to account for the evidence. Voltaire's theology became more deistic with growing criticism of Catholic authority, together with an interest in Eastern beliefs (figure 5). This led to periods of imprisonment and exile. However, following the influence of Newton, he believed the present world of mountains, seas, and caves to be divinely and intelligently created and that catastrophic upheavals could not fit the patterns of nature.³⁴

A dispute arose between Buffon and Voltaire after an anonymous paper on geology was presented in Italian by Voltaire to the Academy of Bologna. This was later translated into French and English.³⁵ There was already a growing tension between him and Buffon, partly because the latter was elected to membership of the Paris Academy of Sciences, while this had been denied to Voltaire. Following news of the discovery of fossilized fish in the Alps, such as pike-fish and turbot, and other fossilized creatures in the Middle East, Voltaire went to great lengths to deny that they were real fossils or that they were attributable to the Flood or a receding ocean. Instead, he asserted that

“... it is much more natural to suppose, that these fish had been brought thither by some traveller, who, finding them spoiled, threw them away, and, in process of time, they became petrified ...”³⁶

Voltaire seemed to reject the evidence that tongue stones *Glossoptera* were the teeth of ancient sharks (fish-dogs), or that ammonites were in some way similar to the nautilus. He wrote that it was a mystery that philosophers did not accept that ammonites were produced naturally in the earth, or that they were remains of coiled eels or snakes. And he rejected Réaumur's studies of the shell-rich layers of Tours, arguing that the fossils could almost be seen to ‘vegetate’ if watched for long enough.³⁷ Buffon mocked these assertions, ironically in a manner typical of Voltaire, suggesting that he should have added that travelling monkeys might have dropped sea shells on European mountains.

“... why has he not added that it was monkies[sic] who transported the shells to the tops of these mountains, which were never inhabited by men? This would not have spoiled but rendered his explanation still more probable.”³⁸

Andrew Dixon White commented that Voltaire used “wisdom and wit” to support his deistic faith and this drove him to oppose the geological investigations of his time.

“[Voltaire's] system was opposed to that of the sacred books of the Hebrews; and, fearing that ... new discoveries [of marine fossils found at elevation in Europe] might be used to support the Mosaic accounts of the Deluge, all his wisdom and wit were compacted into arguments to prove that the fossil fishes were remains of fishes intended for food, but spoiled and thrown away by travellers; that the fossil shells were accidentally dropped by crusaders and pilgrims returning from the Holy Land; and that the fossil bones found between Paris and Étampes were parts of a skeleton belonging to the cabinet of some ancient philosopher.”³⁹

White commented that Voltaire was concerned that belief in a universal receding ocean gave too much support to Christians who believed the Genesis account. The British promoter of uniformitarian geology Charles Lyell believed that Voltaire really accepted the organic origin of fossils, but was acting to “inculcate scepticism” through deception because of the beliefs of the ‘vulgar’ people regarding Noah's Flood. Lyell remarked:

“He would sometimes, in defiance of all consistency,



Figure 5. François-Marie Arouet, known as Voltaire, painting by Nicolas de Largillière 1724–1725. Even his sympathizers have said he used deception in order to undermine the biblical Flood.

shift his ground when addressing the vulgar; and, admitting the true nature of the shells collected in the Alps and other places, pretend that they were Eastern species, which had fallen from the hats of pilgrims coming from Syria. The numerous essays written by him on geological subjects were all calculated to strengthen prejudices, partly because he was ignorant of the real state of the science, and partly from his bad faith.”⁴⁰

Voltaire recognized that the presence of organic fossils was the strongest evidence for the biblical Flood for believers, but Lyell suggested that he had resorted to “bad faith” when faced with such evidence out of “a desire to invalidate Scripture”. It is with some irony that Lyell’s criticism of Voltaire concerned to the latter’s ignorance and perceived toxicity towards geological science, and not because Voltaire was using deceit to establish the truth of a scientific theory and undermine Scripture.

Voltaire was also willing to accept the possibility of long ages, for instance, of a procession of the equinoxes over approximately 25,000 years. But he did not think scientists could accurately build a knowledge of the past. The French astronomer Chevalier de Louville suggested a climate-changing pole-to-pole, north–south progression of the earth upon a slowly rotating equatorial axis. This idea came in for specific criticism by Voltaire, who likened the speculations and imaginations of theorists and philosophers to that of the common people who demand a change of scene in a theatre. Voltaire commented that “Revolutions of thousands of millions of years are infinitely less in the light of the Great Architect of Nature, than to us that of a wheel which compleats [sic] its round in the twinkling of an eye.”⁴¹

There was also a growing affinity for Hinduism within Voltaire’s thinking as the Oriental religion became popular in 18th-century elite French society. This interest grew alongside vegetarianism and acceptance of a religion of nature with its preference for evolutionary powers. Voltaire believed that the Eastern religion was based upon human experience and not divine revelation, and that it was the source of Pythagorean science.⁴² From this viewpoint the apparent antiquity of Hindu texts was used by Voltaire to denounce sacred Scripture.⁴³ He spoke for instance of the *Ezour Veda* as being a valuable gift, for which the Western powers owe a debt of gratitude to the Eastern nation, and although this particular work was not what it seemed (it was the work of over-zealous Jesuits), it showed his interest and commitment.⁴⁴

Conclusion

Although Fontenelle, de Maillet, and Comte de Buffon recognized that the evidence of fossils on mountains tops was evidence that the sea once covered the mountain, the obvious

flood candidate, Noah’s Flood, was arbitrarily rejected because it was perceived to be known only from a religious text. Fontenelle used his position to develop and promote his own theory along Cartesian lines, but subtly ignored the significance of the evidence presented and over-extended his imagination. Buffon said the Flood was so tranquil that it left no evidence, even leaving trees in place. Instead, he thought the fossil evidence was a result of previous unknown floods that happened many thousands or millions of years ago. De Maillet’s edited work also argued for millions of years of change by a receding ocean, but his thinking was also influenced by Hinduism. In unpublished papers he spoke of billions of years for the age of the earth. Voltaire was critical of the idea of a receding ocean because he thought it gave too much credence to the Flood supporters. However, even those sympathetic to his cause have suggested he was acting deceptively.

We can see, then, that the Genesis Flood account was undermined through use of deception, an excessive imagination and interest in Eastern religions. Despite the Flood having strong explanatory power, the Cartesian methodology ruled it out of geological science arbitrarily. This example also shows the weakness of methodological naturalism.

In terms of motivation, the influence of the Jesuits may be significant to this discussion, as they were strongly opposed to the Protestant Reformation with its commitment to *Sola Scriptura*. In the 17th century Pascal had even accused the order of moral laxity and an abuse of casuistry in his *Lettres provinciales* of 1656–1657.⁴⁵ Casuistry in practice may justify deception in order to achieve a perceived greater purpose. The order became very influential, but widely distrusted, and was banned in France in 1764 because it seemed to be out of the control of the political rulers. The order was also abolished by Pope Clement XIV in 1773, but reinstated 1814. It might be seen, then, that the attack on a literal reading of Genesis in 18th-century France was partly to undermine the Protestant maxim of *Sola Scriptura* in Europe. But there was also growing political unrest together with the rise of Eastern religions and atheism in French society.

References

1. Stott, R., *Darwin’s Ghosts: In search of the first evolutionists*, Bloomsbury Publ., London, p. 117, 2012.
2. Fontenelle, B., *The Plurality of other Worlds*, Gunning, E. (trans.), Paternoster-Row, London, pp. 129–141, 1803.
3. Fontenelle, B., Of the origin of fables; in: Feldman, B. and Richardson, R.D. (trans.), *The Rise of Modern Mythology 1680–1860*, Indiana University Press, Bloomington, IP, p. 16, 1972 (Based on Carre, J.R., *De l’origine des fables*, critical edition, Paris, Felix Alcan, 1932).
4. Rappaport, R., Fontenelle interprets the earth’s history; in: *Revue d’histoire des sciences*, tome 44, no. 3–4, pp. 281–300, 1991.
5. Pascal commented on Descartes: “In all his philosophy he would have been quite willing to dispense with God. But he had to make Him give a fillip to set the world in motion; beyond this, he has no further need of God.” Pascal, R., *Pensées*, section II, The Misery of Man without God, *Pensées* 77, E.P. Dutton & Co, New York, p. 23, 1958.

6. *Histoire et Mémoires de l'Académie royale des sciences*, Paris, Annual volumes from 1699. Fontenelle wrote the *Histoire*.
7. Fontenelle, B., *Histoire*, ref. 6, preface and p. 9, 1699 (Paris, 1702): “on a même eu soin dans les occasions d’y semer des éclaircissemens propres à faciliter la lecture des Mémoires”, from Rappaport, ref. 4, pp. 282–283.
8. Rappaport, ref. 4, pp. 289, 292, 294: “qui se trouvent dans des Lieux où nul autre accident ne peut les avoir portés, & où l’on ne peut croire qu’il y ait jamais eu d’eau depuis ce temps-là.” (Use of double negatives in French usually reinforces the negative, unlike in English where two negatives make a positive).
9. Rappaport, ref. 4, *Histoire* ..., 1708 (1709), p. 30: “Descartes ... est le premier qui ait eu la pensée d’expliquer mécaniquement la formation de la Terre, ensuite Stenon, Burnet, Woodward, et enfin M. Scheuchzer, ont pris ou étendu ou rectifié ses idées, & ont ajouté les uns aux autres.” Fontenelle included M. Scheuchzer in the list.
10. See, for instance, Walker, T., Geological pioneer Nicholas Steno was a biblical creationist, *J. Creation* 22(1):93–98, April 2008.
11. Rappaport, ref. 4, pp. 287, Fontenelle, *Histoire* ..., 1706 (1707) 9–11.
12. Jolley, N. (Ed.), *The Cambridge Companion to Leibniz*, CUP, Cambridge, pp. 326–328, 1995. Leibniz, *Monadology*, par. 87–88, G VI 622: AG 224.
13. Rappaport, ref. 4, pp. 288, Fontenelle, *Histoire* ..., 1707 (1708), 5–7: “En supposant qu’elle [la mer] avance toujours également, elle mine-roit 1 000 toises ou une petite demi-lieuë de Moëlon en 12 000 ans.”
14. Jussieu, *Examen des causes des Impressions des Plantes marquées sur certaines Pierres des environs de Saint-Chaumont dans le Lionnois, Mémoires* ..., pp. 287–297, 1718 (1719), pp. 287–297. In Rappaport, ref. 4, pp. 295–296: “autant de volumes de Botanique qui dans une même carrière composent, pour ainsi dire, la plus ancienne Bibliothèque du monde.”
15. Jussieu, ref. 14, p. 287, Rappaport, ref. 4, p. 296: “La plupart des terres qui semblent avoir été habitées de temps immémorial, ont été originairement couvertes de l’eau de la Mer qui les a depuis ou insensiblement, ou tout à coup abandonnées.”
16. Fontenelle, *Histoire* ..., 1720 (1722), pp. 5–9, in Rappaport, ref. 4, p. 297: “Les changemens qui nous sont connus depuis le temps des Histoires, ou des Fables qui ont quelque chose d’historique, sont à la vérité peu considérables, mais ils nous donnent lieu d’imaginer aisément ceux que des temps plus longs pourroient amener.”
17. Fontenelle, ref. 16, in Rappaport, ref. 4, “il reste effectivement sur la Terre beaucoup de vestiges du Déluge universel rapporté par l’Écriture Sainte.”
18. Repcheck, J., *The Man who Found Time: James Hutton*, Simon & Schuster, London, p. 99, 2003; de Maillet, B., *Telliamed, or Discourses between an Indian Philosopher and a French Missionary, on the Diminution of the Sea* ..., Carozzi, A.V. (trans. and ed.), University of Illinois Press, Urbana, Chicago & London, 1968; Dalrymple, G.B., *Ancient Earth, Ancient Skies: The age of the earth and its cosmic surroundings*, Stanford CA, pp. 28–29, 2004.
19. Stott, ref. 1, p. 116.
20. Stott, ref. 1, pp. 108, 130.
21. de Maillet, B., *Telliamed ou entretiens d’un philosophe indien avec un missionnaire françois, sur la diminution de la Mer, la formation de la Terre, l’origine de l’Homme*, etc, Put in order on the Memoirs of the late M. de Maillet by J. Antoine Guers, Amsterdam, The Honoured and sons, 1748.
22. One may wonder whether there is similarity between *Telliamed* and the Babylonian half-fish half-man god *Tiamat*, bearing in mind de Maillet’s obsession with mermaids and mermen.
23. Cutler, A., *The Sea Shell on the Mountaintop*, Penguin, London, p. 192, 2003. With influence from Epicurus, Averroes and Spinoza, de Maillet adopted vitalism, believing in an *âme universelle du monde* as *une matière déliée* (world soul as unbounded material). This is similar to Spinoza’s *natura naturans*, a self-creating natural force; evidently pantheism. Spinoza, B., *Ethics*, parts 1 and 3, prop. 29, Scholium, Curley, E. (trans.), Penguin, London, 1996. Israel, J.I., *Enlightenment Contested: Philosophy, modernity, and the emancipation of man 1670–1752*, Oxford University Press, Oxford, ch. 28, 2006.
24. de Maillet, B., *Telliamed, or Discourses between an Indian Philosopher and a French Missionary, on the Diminution of the Sea* ..., English Translation, printed by Osborne, T., London, pp. 112, 128, 1750; see also Stott, ref. 1, p. 118.
25. de Maillet, ref. 24, p. 112.
26. Repcheck, ref. 18, p. 99; de Maillet, ref. 18; Dalrymple, ref. 18, pp. 28–29.
27. Stott, ref. 1, pp. 133–142. And Diderot, D., “Animal”; in: Diderot and d’Alembert (Ed.), *Encyclopaedia*, vol. 1, p. 469, 1753–1772.
28. de Buffon, G.-L.L., *Theory of the earth*; in: *Natural History*, trans. from French 1792, vol. 2, article xix, printed by J.S. Barr, London, p. 238, 1792.
29. de Buffon, ref. 28, article v, vol. 1, pp. 151–152.
30. Rudwick, M.J.S., *Bursting the Limits of Time*, University of Chicago Press, Chicago, pp. 128–130, 2005.
31. de Buffon, G.-L.L., *The Epochs of Nature*, Zalasiewicz, J., Milon, A.S., and Zalasiewicz, M., (trans.), University of Chicago, p. xxvii, 2018; See also: Rudwick, ref. 30; Repcheck, ref. 18, p. 101; Prothero, D.R., *Bringing Fossils to Life*, 3rd edn, Columbia University Press, New York, p. 112, 2003; Baxter, S., *Revolutions in the Earth: James Hutton and the True Age of the World*, Weidenfeld and Nicholson, London, p. 55, 2003.
32. Mortenson, T., *The Great Turning Point*, Master Books, Grand Rapids, MI, pp. 26–27, 2004.
33. Some of this is discussed in Reed, J.K., Three early arguments for deep time—part 2: volcanism, *J. Creation* 26(1):61–70, 2012.
34. Fellows, O., *From Voltaire to La Nouvelle Critique*, Librairie Droz, Geneva, pp. 22–32, 1970. McCalla, A., *The Creationist Debate*, Continuum, London, p. 156, 2006. Snobelen, S., “‘This most beautiful system’: Isaac Newton and the Design Argument”; in: God, Nature and Design Conference, Ian Ramsey Centre, Oxford, 2008: “all material Things seem to have been composed of the hard and solid Particles above-mention’d[sic], variously associated in the first Creation by the Counsel of an intelligent Agent.” Newton, I., *Opticks*, Query 31, 4th edn, 1730.
35. Voltaire, (Arouet, F.M.), *Dissertation on the changes that have happened in our globe, and on the Petrifications which are alleged as Proofs thereof*, written originally in Italian, and sent by the Author to the Academy of Bologna, and since translated by him into French, in Smollett, T. et al., (trans.), *The Works of M. de Voltaire*, vol. 18, London, pp. 243–256, 1762.
36. Voltaire, ref. 35, p. 243.
37. Cutler, ref. 23, p. 195.
38. de Buffon, G.-L.L., *Theory of the Earth*, ref. 28, article vii, vol. 1, p. 235; See also Fellows, ref. 34.
39. White, A.D., *A History of the Warfare of Science with Theology in Christendom*, vol. 1., D. Appleton and Co., New York, pp. 228–229, 1896. This work basically argued that Christianity was opposed to science.
40. Lyell, C., *Principles of Geology*, 9th edn, book 1, chap. 4, University of Adelaide, Adelaide, AUS, pp. 54–55, 1854 (this passage is also in early editions from 1834).
41. Voltaire, ref. 35.
42. Elst, K., *Decolonizing the Hindu Mind*, publ. India, Rupa, p. 44, 2001; Voltaire, *Lettres sur ‘origine des sciences et sur celle des peuples de l’Asie*, 1st edn, letter dated 15 December 1775, Paris, 1777.
43. Stuart T., *The Bloodless Revolution: Radical Vegetarianism and the Discovery of India*, W.W. Norton & Co., New York, p. xxiv, 2006.
44. This particular work was later denounced as ‘childish drivel’, in reality a fraudulent mixture of Hindu and Christian sayings, and the work of over-zealous Jesuits; Muller, F.M., *Physical Religion*, The Gifford Lectures, Lecture 3, 1890. The Veda as Studied by European Scholars, Longmans Green & Co., London, 1891.
45. Casuistry is a system of ethics based on case studies or individual situations and not from higher principles, and if abused can argue that the end justifies the means.

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Deep time in 18th century France—part 2: influence upon geology and evolution in 18th and 19th century Britain

Andrew Sibley

The first part to this paper showed how, in 18th century France, the influence of non-scientific factors encouraged belief in deep time and a rejection of the Noahic deluge. There was a prior commitment, through Cartesian methodology, to remove the testimony of Scripture from science, and to prefer fallible human inductive inferences. There was also misrepresentation of the geological evidence where it supported Scripture; a growing preference for deep time and evolution, that partly stemmed from Eastern religions; and growing political agitation for revolution. This paper discusses, albeit briefly, how these influences from France shaped beliefs in Britain during the 18th century, specifically through the work of David Hume, Erasmus Darwin and James Hutton. Then it will be considered how these 18th century beliefs were re-shaped by Charles Lyell and Charles Darwin for 19th century consumption. The link to France was seemingly written out of the narrative, and the overt paganism was removed, while retaining the flawed naturalistic methodology that arbitrarily rejected biblical testimony. As part of this process a slow and silent attack was used against Christianity to avoid causing open offence, that is until after the publication of Darwin's *Origins*.

As discussed in part 1, through the early 18th century in France a belief in deep time gradually developed amongst parts of elite French society, and this fed into the belief that an evolutionary process had shaped life on Earth.¹ This development has been described by Lovejoy as the ‘temporalization’ of the Aristotelian concept of a Great Chain of Being.² It became more pronounced in the middle and latter part of the 18th century. With the placement of this chain within the context of deep time, acceptance of a directly created and designed hierarchical order was undermined. Lovejoy suggests Buffon, Diderot, and Jean Baptiste Robinet³ were major contributors to this change in France, but evidence presented in part 1 shows it extended back to Fontenelle and De Maillet.

The thinking of French academics encroached into the work of British men such as David Hume, James Hutton, and Erasmus Darwin. Reed comments that in the late 18th century the leading naturalists and proponents of deep time were French, but following the disruption of the French Revolution and Napoleonic wars the sphere of influence transferred to Britain.⁴ However, the debt to French academics was downplayed by Lyell and Darwin in 19th century Britain. This may have been partly for reasons of national prestige and pride, but there was also fear in the establishment of the revolution taking hold in Britain.⁵

The influence of Jesuits was briefly discussed in part 1. They were accused by well-regarded academics such as Pascal of the error of casuistry: effectively a system of

ethics that allowed the setting aside of the law in some cases. From this, it was noted that *some* Jesuit-trained academics deceitfully undermined the Creation and Flood accounts, possibly as an attack on the Protestant Reformation, but full motivation remains unclear. There is insufficient space to discuss it further here. This paper will first focus on the French influence upon David Hume, Erasmus Darwin, and James Hutton in the 18th century, and then look at the influence of Charles Lyell and Charles Darwin in the 19th century.

David Hume

David Hume (1711–1776) is not explicitly connected to the rise of belief in deep time and evolution in 18th century France, but the link is there (figure 1). He was central to the Scottish Enlightenment and wrote against miracles and the design argument.⁶ The well-connected Hume attended Edinburgh University at a young age, studying Roman authors such as Virgil and Cicero.⁷ In his early twenties he travelled to Paris and Reims, and later resided at the Jesuit Royal College of La Flèche for two years (1735–1737) conversing with the tutors, evidently as their guest. This was the same school that Descartes had attended. It was during this time that he may have come into contact with the Eastern beliefs of Hinduism and Buddhism, for instance through Jesuit missionaries such as Ippolito Desideri and Charles Francois Dolu. Alison Gopnick has noted similarity between

parts of Hume's *Treatise of Human Nature*, which was written during this period, and the beliefs of Buddhism.⁸ However, it has also been suggested that Hume might have gained knowledge of Eastern religions through the *Dictionnaire Historique et Critique* of Pierre Bayle (a Jesuit-educated French academic) and perhaps also through the influence of Sextus Empiricus's (AD 160–210) *Outlines of Pyrrhonism*.⁹ Pyrrho is believed to have travelled to India with Alexander the Great and catalogued the beliefs of Eastern religions. His work is now mainly known through the text of Sextus Empiricus, which was widely read during the early modern period by Western academics.

So, Eastern religious beliefs may have become entwined into Hume's thinking during his stay in France. The Buddhist influence is noted by Gopnick in Hume's attempt to reject the self, thus going further than Descartes' philosophy which had made the self the foundation of knowledge.⁸ Furthermore, in later years, through his posthumously published *Dialogues Concerning Natural Religion*, Hume referenced the beliefs of Hinduism as well as Greek paganism to challenge the design argument. This work is written in the form of a dialogue between three characters: Demea, Cleanthes, and Philo.

"The world, say I [Hume's character Philo], resembles an animal; therefore it is an animal, therefore it arose from generation. ... Hesiod, and all the ancient mythologists were so struck with this analogy, that they universally explained the origin of nature from an animal birth and copulation. Plato too, so far as he is intelligible, seems to have adopted some such notion



Figure 1. David Hume, 1711–1776. Historian and philosopher. Painting by Allan Ramsay, 1766.



Figure 2. Erasmus Darwin, about 1793. Oil painting by Joseph Wright of Derby, located in Derby Museum and Art Gallery.

in his *TIMAEUS*.

"The Brahmins assert that the world arose from an infinite spider, who spun this whole complicated mass from its bowels, and annihilates afterwards the whole part of it, by absorbing it again, and resolving it into its own essence."¹⁰

Hume's allusion here to Hindu beliefs suggests he believed in changes over millions or billions of years, or even to an eternal cyclical cosmology. However, scholars still debate Hume's actual position in the *Dialogues*, and generally see him as skeptical of religion and the design argument in general. But it is notable that Erasmus Darwin, a close acquaintance of Hume, thought the position outlined in part VII of the *Dialogues* (partially quoted above) was Hume's real belief. If so, Hume was arguing for an esoteric power of generation. Erasmus Darwin comments:

"The late Mr. David Hume, in his posthumous works, [*Dialogues*] places the powers of generation much above those of our boasted reason; and adds, that reason can only make a machine, as a clock or a ship, but the power of generation makes the maker of the machine, and probably from having observed, that the greatest part of the earth has been formed out of organic recrements ... he concludes that the world itself might have been generated, rather than created; that is, it might have been gradually produced from very small beginnings, increasing by the activity of its inherent principles, rather than by a sudden evolution of the whole by the Almighty fiat."¹¹



Figure 3. Erasmus Darwin's coat of arms

Hume returned to Paris as the secretary to the British Embassy between 1763 and 1765, and then accompanied the exiled French–Swiss political philosopher Jean-Jacques Rousseau (1712–1778) back to England, where Rousseau later became acquainted with Erasmus Darwin.¹² Rousseau was also a close friend of the atheist Diderot and wrote for his *Encyclopédie*, and his writing was also an influence upon French revolutionary Jacobins such as Robespierre.

Erasmus Darwin

Erasmus Darwin (1731–1802; figure 2) expressed his belief in deep time extending over millions of years, and a form of evolution, in his written works: for instance, *The Temple of Nature*, *The Botanic Garden*, and *Zoonomia*. Mention of millions of years in Erasmus Darwin's works appears in the Philosophical Notes to *The Botanic Garden* (1791). He commented at some length on the changing nature of the earth's rock layers and formations: "extensive beds of clay, marl, sand-stone, coal, and iron, which were probably for many millions of years the only parts of our continent and islands, which were then elevated above the level of the sea".¹³

He was also an open advocate of the pagan beliefs of ancient Greece and Rome, was a leading Freemason, and used Rosicrucian imagery.¹⁴ In *Zoonomia*, first published in 1794, he spoke of the "magnificent idea of the infinite power of THE GREAT ARCHITECT! THE CAUSE OF CAUSES!"¹⁵ and asked whether it would

"... be too bold to imagine, that in the great length of time, since the earth began to exist, perhaps millions of ages before the commencement of the history of mankind, would it be too bold to imagine, that all warm-blooded animals have arisen from one living filament, which THE GREAT FIRST CAUSE endued with animality..."¹⁶

Such statements in his works relating to millions of ages and the deity of freemasonry seem to echo Voltaire's earlier reference to the Great Architect, and millions of years of change: "Revolutions of thousands of millions of years are infinitely less in the light of the Great Architect of Nature, than to us that of a wheel which compleats [sic] its round in the twinkling of an eye."¹⁷

In Hume and Erasmus Darwin's thinking there was evidently an understanding regarding evolution that stemmed from ancient paganism. Darwin's family motto was *E Conchis Omnia*, meaning "everything from shells", and he used the image of a scallop shell on the family crest, for a time painted on his carriage (figure 3).¹⁸ In Greek mythology, Aphrodite, the goddess of love (the Roman Venus), was often depicted riding the ocean upon a scallop shell (and also in Renaissance art—figure 4). While in Hesiod's *Theogony*, which Hume referenced in *Dialogues*, Cronos (sometimes considered synonymous with Chronos, the god of time) castrated his father Uranus, the god of the sky, and threw the members into the sea. After a long period of time a foam formed around them and within grew the beautiful goddess Aphrodite, who eventually floated to Cyprus:

"And so soon as he had cut off the members with flint and cast them from the land into the surging sea, they were swept away over the main a long time: and a white foam spread around them from the immortal flesh, and in it there grew a maiden. First she drew near holy Cythera, and from there, afterwards, she came to sea-girt Cyprus, and came forth an awful and lovely goddess."¹⁹

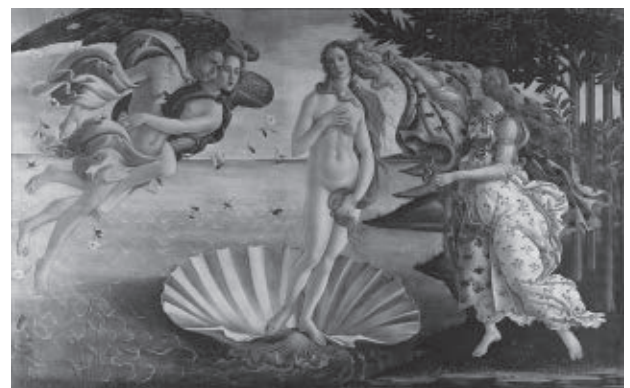


Figure 4. Sandro Botticelli, *The Birth of Venus*, 1484–1485. Erasmus Darwin later saw the birth and beauty of Venus as an allegory for evolution.

In *The Temple of Nature*, Erasmus Darwin spoke of the goddess Venus in terms of an allegory for evolution: “Amazed the Sea’s prolific depths I view, And VENUS rising from the waves in YOU! . . . Her beaux and beauties, butterflies and worms, Rise from aquatic to aerial forms.” In the footnote there is the comment: “Venus seems to have represented the beauty of organic Nature rising from the sea . . .”²⁰ So, it may be seen that Erasmus Darwin read Venus/Aphrodite as an allegory for evolution occurring as a result of generating powers, and a similar view may have been held by Hume. These generating powers were deep time, sexual desire, and chaotic forces (effectively natural selection, but guided by an impersonal esoteric force in nature).²¹ The beautiful goddess was said to have risen out of the foam, and ridden the chaotic waves over extended periods of time. Charles Darwin (1809–1882) later developed the ideas in *Zoonomia* along more Epicurean lines, removing the overt paganism of his grandfather. But there was a commitment to long ages before any real scientific justification was available, and this passed primarily through earlier French sources. Charles Darwin seems to have borrowed heavily from *Zoonomia*.²²

As well as influence from Hume and Voltaire, Erasmus Darwin was evidently influenced by various geological theories that came out of France in the preceding decades, in the first instance through the work of Buffon. Copies of Buffon’s works were in Erasmus Darwin’s possession,²³ and he quoted him several times in his writing; for instance, in *The Botanic Garden* he discussed Buffon’s theory of the origin of the solar system.²⁴ However, Buffon was reticent to speak publicly of his belief in long ages beyond tens of thousands of years. On the other hand, Diderot was perhaps one of the first French authors to speak openly (in the middle of the 18th century) of evolutionary change occurring over millions of years, and blended this with his political beliefs. Diderot was also an influence upon Erasmus Darwin’s thinking, as Margaret Jourdain for instance has suggested.²⁵ In 1754, in *Thoughts on the Interpretation of Nature*, Diderot wrote:

“... might not the philosopher, left to his own thoughts [without religious instruction], suspect that animality had its elements from all eternity mixed up and dispersed in the mass of matter; that these elements happen to encounter one another ... [and] that millions of years passed between each of these stages ...?”²⁶

The other link to France in Erasmus Darwin’s thinking, albeit indirectly, was through James Hutton. Erasmus Darwin expressed some qualified support to Hutton’s scientific work, calling it ‘ingenious’. He understood that Hutton’s *Theory of the Earth* advocated an eternal universe: “according to the ingenious theory of Dr Hutton, who says new continents are now forming at the bottom of the sea to rise in their turn, and that thus the terraqueous globe has been, and will be,

eternal?”²⁷ Erasmus Darwin also discussed the idea of a receding ocean, as well as the emerging land mass: “by these means the solid part of the terraqueous globe has perpetually been in an increasing state, and the waters perpetually in a decreasing one”.²⁸

With the onset of revolution in France, those closely associated with the French thinkers in Britain were suddenly under suspicion. Some were arrested and imprisoned, although Erasmus Darwin only felt the force of state-sanctioned mockery through the short-lived *Anti-Jacobin* publication of 1797–1798, founded by Tory Government Minister George Canning.

James Hutton

James Hutton (1726–1797) was well connected to the thinking of 18th century French naturalists, and he acknowledges some of it in his writing (figure 5). He was present in Paris at the *Collège de Sorbonne* to pursue his medical studies in the year that De Maillet’s work was published (1748). His Parisian studies in medicine included chemistry and anatomy, and Dean suggests that he may have attended the lectures of Guillaume-François Rouelle, that also covered geology. Rouelle was the foremost authority on chemistry in Paris at the time, having gained the position of *démonstrateur* at the prestigious *Jardin du Roi* (later *Jardin des Plantes*) in 1743, this through the recommendation of Buffon.²⁹ The *Jardin du Roi* was established in part to collect and study herbs for medicinal purposes, but branched out

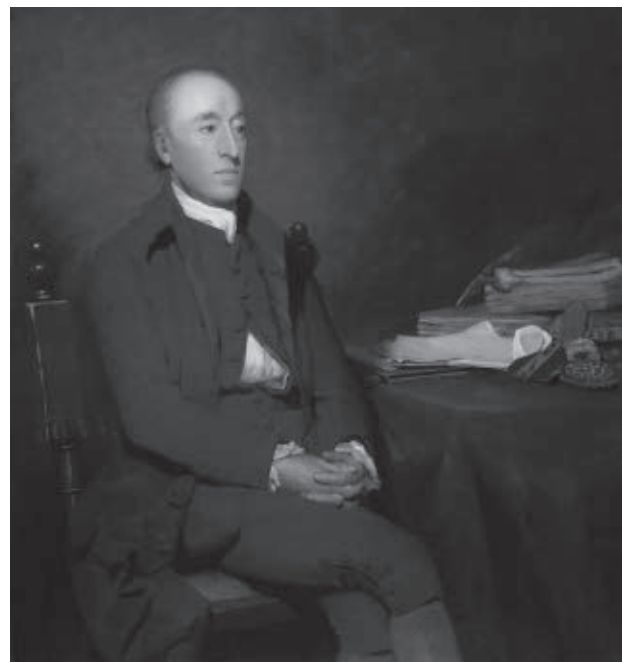


Figure 5. James Hutton, 1726–1797. Geologist, by Henry Raeburn, 1776.

to include research into chemical compounds, which led to studies in geological strata. As well as research, Rouelle's role as *démonstrateur* included practical and colourful demonstrations of chemistry, and these were popular and well attended by Parisian students. Geikie relates the revelation of Rouelle's student Nicholas Desmarest (1725–1815) who attended his mentor's classes. From this position Rouelle would inform the students of the systematic nature of the fossil record, wherein fossil shells were often found organised in the strata. His opinion was that such evidence could not have been laid down by a violent deluge such as Noah's Flood, echoing the earlier opinion of Fontenelle and Buffon.³⁰ By spending a couple of years in Europe, including time at college in Paris, Hutton had ample opportunity to acquaint himself with the latest views of the fossil record amongst French academics.

It is notable that Desmarest was a student of Rouelle in Paris around the period 1746 to 1748, and may have been acquainted with Hutton. Desmarest later studied the basalt formations in the Auvergne region of France in 1763 and compared them to the Giant's Causeway of Ireland. But although he recognised the influence of volcanism in shaping the landform he was also strongly influenced by Rouelle's flood theory for the formation of the sedimentary layers identified in France. Therefore, he considered that the power of volcanism to shape landforms was limited. Desmarest's studies also led to consideration of the erosive power of water upon the valleys of Auvergne over extended periods of time, and he speculated on rate uniformity. His research was published in several papers between 1765 and 1775.³¹

The geologists Hutton referenced in his works of 1788 and 1795 were primarily French, or French-speaking, and he quoted them at some length in their native language.³² This included Jean-André Deluc, and the Chevalier Déodat de Dolomieu who observed different forms of volcanic lava around Etna and the Lipari Islands (although he did not attempt to form it into a general theory). The other notable reference was to the French-Swiss Horace-Bénédict de Saussure and his work *Voyage dans les Alpes*. Saussure referenced the geology of the Alps in order to develop a general theory of the earth and accepted successive catastrophes over extended periods of time, primarily involving the action of water.³³ While in Paris, Saussure had opportunity to discuss geology with Buffon and Desmarest.³⁴

The influence of the French geologists was clearly evident in Hutton's thinking. But unlike their belief that an erosive ocean had shaped the earth's surface, Hutton included a general restoring force in his theory. This was seen in terms of a machine and as a 'reproductive operation' from pressure and volcanic heat. Internal forces then were considered necessary to lift the earth's surface above sea level to counter the erosional work of water upon the landforms. In this

way he attempted to develop his own general theory of the earth.³⁵ Rudwick observes that Hutton was more of a geo-theorist than some of the French academics, and only after presenting his theory did Hutton attempt to justify it from observations.³⁶ Hutton's work differed somewhat from Buffon's ideas even though both involved the action of heat and water.³⁷ However, Hutton's work was not without criticism. His extension of the power of heat to sedimentary rock formation such as limestone was widely questioned, not least because it was known through the industrial use of limekilns that excessive heat made limestone sufficiently brittle to form it into cement.³⁸

Like the French deists, Hutton saw in nature the work of an intelligent agent, and also believed that geological formations were evidence of the great age of the earth. While allowing that Moses may have recorded the origin of mankind in his 1788 paper, he thought the fossil record provided evidence of a much greater history: "We find in natural history monuments which prove that those animals had long existed."³⁹ And from the study of natural processes he thought it possible to "procure a measure for the computation of a period of time extremely remote, though far from being precisely ascertained".³⁹ Playfair, Hutton's interpreter, used Buffon's expression of an abyss of time to describe the length of time believed necessary for geological change to occur.⁴⁰ However, as Rudwick documents, it was generally recognised that Hutton was advocating an eternity of time in which the earth's surface might be changed.⁴¹ But at the same time, he was skeptical of calculating uniform rates because he thought the processes were acting too slowly. Without human written documentation over "millions ... of the races of men", reliance may only be placed upon inductive reasoning and scientific laws that are applied to the evidence.⁴² Hutton compared the problem with an attempt to measure distant objects in space without a parallax.⁴³

Hutton's work was later interpreted by Playfair; the excuse being to make Hutton's verbose work, which contained pages of notes in French, more readable. However, Rudwick suggests that Playfair effectively misrepresented Hutton's work by removing it from its deistic framework and sidelining the teleology, the purpose being to present it in a way that 19th century natural scientists could accept.⁴⁴

Charles Lyell and Charles Darwin

Charles Lyell (1797–1875) further promoted and extended the work of James Hutton, but downplayed the French connection (figure 6). Gould comments that Lyell was rewriting geological history, and prejudice meant that the influence of the French geologists was hidden in order to establish a British hero. Furthermore, the reconstructed historical narrative that Lyell wanted to portray was that

Hutton's gradual processes were accepted on the basis of empirical evidence against the untested theories of the hard-fighting catastrophists. Gould suggests this was "one of the most flagrant mischaracterizations ever perpetrated by the heroic tradition in the history of science".⁴⁵

Lyell was also evidently seeking to "free the science [of geology] from Moses"⁴⁶ but was doing so in a disguised manner. As Grinnell has suggested, there was a subtle, political attack on the Anglican establishment and the monarchical theory of government by a group of liberal academics and scientists. This liberal cause acted in a similar fashion to the one enacted in France against the Royal establishment, but in a more subtle manner to avoid the charge of sedition and revolution.⁴⁷ In private correspondence Lyell suggested that if triumphalism could be avoided, and charm and liberal compliments were used, it would be possible to get the "bishops and enlightened saints" to "join us in despising both the ancient and modern physico-theologians"⁴⁶ (i.e. those who were arguing that the geological evidence confirmed the Bible's account of Noah's Flood).⁴⁸ And yet his wider aims were hidden from view for a period of several decades.

"If I have said more than some will like, yet I give you my word that full *half* of my history and comments was cut out, and even many facts; because either I, or Stokes, or Broderip, felt that it was anticipating twenty or thirty years of the march of honest feeling to declare it undisguisedly. ... P.S. ... I conceived the idea five or six years ago that if ever the mosaic geology could be set down without giving offence, it would be in an historic sketch."⁴⁶

Evidence from private correspondence shows that Lyell included Charles Darwin (figure 7) in the deceitful plan of action to undermine biblical faith in Britain. While in early years Lyell did not openly accept evolution, he encouraged Darwin to write his work over a couple of decades and was only one of a few who knew of Darwin's plans initially. In a letter in 1836, the young Darwin seemed flattered that "Lyell entered in the *most* good natured manner, and almost without being asked, into my plans."⁴⁹ Lyell helped to direct the young Darwin's plans, and they put them into practice through a slow and silent attack upon Christianity, as Voltaire and other revolutionaries had done more forcefully in 18th century France. Like Voltaire, Lyell, and perhaps Darwin, were Unitarian deists, and hostile to the authority of the Anglican establishment in matters of science as well as faith. They wished to remove this influence from science. Darwin confesses his part in the plan in private correspondence in 1873:

"Lyell is most firmly convinced that he has shaken the faith in the Deluge ... far more efficiently by never having said a word against the Bible, than if he had acted otherwise. P.S. ... I have lately read Morley's



Figure 6. Portrait of Charles Lyell, date unknown, by George J. Stodart

Life of Voltaire & he insists strongly that direct attacks on Christianity (even when written with the wonderful force & vigour of Voltaire) produce little permanent effect: real good seems only to follow from slow & silent side attacks."⁵⁰

In Morley's biography of Voltaire, the French academic is praised for quick wit, intelligence and charm, but notes that his followers were careful in what they said for the purpose of promoting heterodox ideas slowly in a rather devious manner. "The strain that society has undergone since Voltaire's day has taught men to qualify their propositions. It has forced them to follow truth slowly along paths steep and devious."⁵¹ Lyell was also clearly aware of the deceit in Voltaire's work, and observed that he was acting with "bad faith" in order to "inculcate scepticism" and "strengthen prejudices" towards Christianity.⁵² So, there is documented evidence that Lyell and Darwin were working in secret over many years to undermine and remove the scriptural account of creation from science (and incidentally, like Voltaire, it is notable that Lyell was also willing to write about the beliefs of the 'Hindoos' and ancient Egyptians with more sympathy than towards the Old Testament).⁵³

Lyell's overconfidence also ran into Hume's problem of induction. It was openly stated in the subtitle of his *Principles of Geology as An attempt to explain the former changes of the earth's surface by reference to causes now in operation*. Hume had earlier recognized that "all inferences from experience suppose, as their foundation, that the

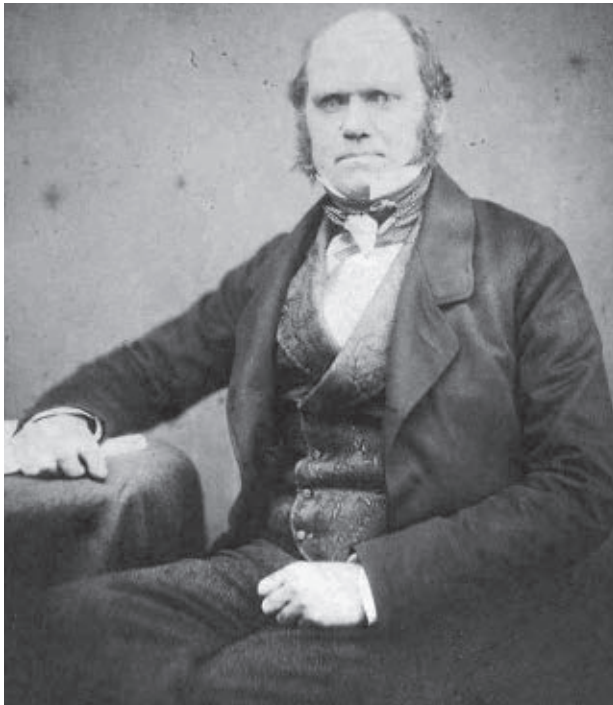


Figure 7. Photograph of Charles Darwin, 1855, by Maull and Polyblank—for Literary and Scientific Portrait Club

future will resemble the past”.⁵⁴ And as Hutton knew, all attempts at measuring the age of geological processes are like measuring distance in space without a parallax.⁵⁵ But Lyell ignored this, as did Darwin in later years. In the first edition of *Origins*, Darwin unwisely attempted to make a rough estimation for the age of the Weald in Southern England. He suggested that it would have taken 100 to 300 million years for erosion by river flow to denude the valley, although this estimate was later withdrawn.⁵⁶ Samuel Wilberforce criticized the estimation on the basis that Darwin was trying to hold together two mutually exclusive arguments: like Lyell, Darwin argued for the “extreme imperfection of the geological record” to account for missing evidence when it suited his cause, and yet at the same time was attempting to apply uniformity of rate over hundreds of millions of years.⁵⁷

Darwin's List

After Darwin's first edition of *Origin of Species* was published, he came under pressure to give credit to predecessors. For instance criticism came from the Rev. Baden Powell that there was insufficient acknowledgement given to previous researchers. Darwin felt under obligation to comply, and Rebecca Stott has highlighted the growing list of evolutionists that Darwin put together.⁵⁸ He included ‘Demaillet’ in the first list of 19 authors, alongside Aristotle, Buffon, Lamarck, and Geoffrey Saint Hilaire from 18th and

early 19th century France. This appeared in the Preface of the first American edition of *Origins* (1860).⁵⁹ He was also keen to show that his work was not overly influenced by French revolutionaries and the list grew to include others from Britain and Europe, including his grandfather. However, in 1860 Richard Owen criticized Darwin by comparing his ‘imaginative temperament’ to that of De Maillet (who had suggested that human beings may have evolved from mermen and mermaids).⁶⁰ The Preface reference to De Maillet was then removed and did not appear in subsequent English editions of *Origins*. As far as Darwin noted Buffon's prior claim to evolution, it was not given in very convincing, nor complete terms:

“... the first author who in modern times has treated it in a scientific spirit was Buffon. But as his opinions fluctuated greatly at different periods, and as he does not enter on the causes or means of the transformation of species, I need not here enter on details.”⁶¹

Charles Darwin also noted that his grandfather's work seems to have resembled the later work of Jean-Baptiste Lamarck: “It is curious how largely my grandfather, Dr Erasmus Darwin, anticipated views and erroneous grounds of opinion of Lamarck in his ‘*Zoonomia*’.”⁶² Lamarck was trained at a Jesuit college in Amiens, and later in 1788 gained position at the *Jardin des Plantes* (formerly *Jardin du Roi*) with the support of Buffon. His flawed theory of evolution was based upon the hereditary transmission of developed characteristics. This involved a force of nature that could direct the process towards greater complexity. As noted above, Erasmus Darwin spoke of an esoteric ‘power of generation’ at work in nature and gave reference to part VII of Hume's *Dialogues* (in which Hume referenced the Brahmins and Hesiod's *Theogony*).

Summary

It is evident that belief in deep time and evolution in Britain grew out of 18th century France. Reference to millions of years or ages of change first appeared in France around 1748–1754 with the work of De Maillet and Diderot, before appearing in James Hutton and Erasmus Darwin's work. Deep time had earlier been advocated in Fontenelle's fictional and scientific works from the late 17th century. Although some of the French writers, for instance De Maillet, had an interest in Hinduism in seeking to justify millions of years of change, the paganism became more overt in the writings of Erasmus Darwin and David Hume. The works of ancient Greece—of Hesiod, Plato, Aristotle and Pyhrro—were easily available to Enlightenment thinkers. James Hutton's geological theory was also clearly influenced by a network of mainly French researchers, with some connection to Buffon and the *Jardin des Plantes*. This closely connects Hutton to the French

camp, but the French link was played down by Playfair and Lyell.

Lyell also planned a secretive campaign to undermine the Anglican establishment in Britain, entraining the young Charles Darwin into his cause. The subterfuge of Voltaire seems to have offered a blueprint for both of them. Lyell and Darwin even admitted to a deceitful campaign against Christianity in private correspondence, and this has previously been discussed by creation authors.⁶³ It is also notable that attempts at measuring the age of the earth in terms of millions or billions of years run into the problem of induction. It must be assumed, without proper foundation, that present geological processes and observed rates are applicable through history. This problem becomes even more pointed when Darwin also argued that the record is extremely imperfect. This problem remains unresolved, although widely ignored by modern secular science.

There is insufficient space to discuss the influence of Jesuit education, but there does seem to be evidence that Christian belief was blended with the Eastern beliefs of deep time and evolution in at least some Jesuit thinking. It later appeared for instance in the writing of the Jesuit priest Pierre Teilhard de Chardin (1881–1955). He has become an icon for 20th century theistic evolutionists, although his beliefs were criticized by C.S. Lewis who described them as “evolution run mad” and “uncomfortably like Pantheism”.⁶⁴ It may be seen however, that the rise of belief in deep time and evolution arose during the 18th century, first in France then in Britain, as a result of the influence of ancient Greece and Eastern religions.

References

- Sibley, A., Deep time in 18th century France—part 1: a developing belief, *J. Creation* 33(1):85–92, 2019.
- Lovejoy, A.O., *The Great Chain of Being*, Cambridge, MA, 1936. Harrison, J., *Erasmus Darwin's view of evolution*, *J. History of Ideas* 32(2):247–264, April–June 1971.
- Lovejoy, ref. 2. Robinet (1735–1820) was a French naturalist who wrote *De La Nature* in five volumes from 1761–1768.
- Reed, J., St Hutton's hagiography, *J. Creation* 22(2):121–127, 2008.
- Some of the French influence has also been described by Malcolm Bowden and Henry Morris: one notable connection was the deist Benjamin Franklin who travelled in France and Britain and corresponded with figures such as Voltaire and Erasmus Darwin. Bowden, M., *The Rise of the Evolutionary Fraud*, Sovereign Publ., Bromley, UK, pp. 100–110, 1982. Bowden quotes Henry Morris as one source who suggested a link between revolution in France and the rise of evolution in Britain, Morris, H., *The Troubled Waters of Evolution*, Creation Life Publ., San Diego, CA, 1980.
- His clan, more usually spelt Home, were well connected in British society, historically supporting the Catholic Stuart claim to the throne (although the eighth Earl Home changed sides during the second Jacobite Rebellion of 1745).
- Hume, D., My own life; in: Lynch, J. (Ed.), *The History of England, from the Invasion of Julius Caesar to the Revolution in 1688*, vol. 1, via Rutgers University, London, pp. 1–21, 1778.
- Gopnick, A., Could David Hume have known about Buddhism? Charles Francois Dolu, the Royal College of La Flèche, and the Global Jesuit Intellectual Network, *Hume Studies* 35(1–2):5–28, 2009.
- Haverschmidt, D., *The Mind as a Kind of Theatre: A critical study of Buddhist influence in David Hume's treatise of human nature*, Master thesis in Global and Colonial History, Leiden University, Holland, 19 July 2017.
- Hume, D., *Dialogues Concerning Natural Religion*, 2nd edn, London, pp.141–142, 1779.
- Darwin, E., *Zoonomia: Or the laws of organic life*, vol. 1, Printed for J. Johnson, St Pauls Church Yard, London, p. 509, 1794.
- Rousseau stayed at Wootton Hall in Staffordshire for a while, while Erasmus Darwin was in Lichfield, about 60 km south. Hele King, D., *Erasmus Darwin*, Charles Scribner & Sons, New York, p. 20, 1963.
- Darwin, E., *The Botanic Garden, a Poem in Two Parts, with Philosophical Notes*, J. Johnston, London, p. 51, note xx, 1791.
- Denslow, W.R., *10,000 Famous Freemasons*, Missouri Lodge of Research, MO, 1957–1961. The Eye (pseudonym), Erasmus Darwin Centre opens in Lichfield, *Freemasonry Today*, issue 9, Summer 1999. He was a member of St David's Masonic Lodge no. 36 in Edinburgh in 1754, and was also a member of Canongate Kilwinning Masonic Lodge no. 2.
- Darwin, E., ref. 11, p. 509.
- Darwin, E., ref. 11, p. 505.
- Voltaire (Arouet, F.M.), Dissertation on the changes that have happened in our globe, and on the petrifications which are alleged as proofs thereof, written originally in Italian, and sent by the author to the Academy of Bologna, and since translated by him into French; in: Smollett, T. *et al.* (trans.), *The Works of M. de. Voltaire*, vol. 18, London, pp. 243–256, 1762.
- King-Hele, D., The furtive evolutionist, *New Scientist* 2390:48–49, 12 April 2003; Grigg, R., Darwinism: it was all in the family, creation.com, accessed 17 November 2018.
- Hesiod, The Homeric hymns and Homerica, *Theogony*, transl. by Evelyn-White, H.G., *Theogony*, William Heinemann Ltd, London, lines 185–195, 1914.
- Darwin, E., *The Temple of Nature, or the Origin of Society: A poem, with philosophical notes*, J. Johnson, London, 1803. Canto I, V, lines 383–4, fn 34: “And in lines 295–312: ‘ORGANIC LIFE beneath the shoreless waves, Was born and nurs'd in Ocean's pearly caves: First forms minute, unseen by spheric glass, Move on the mud, or pierce the watery mass; These, as successive generations bloom, New powers acquire, and larger limbs assume; Whence countless groups of vegetation spring, And breathing realms of fin, and feet, and wing'.” (Incidentally, the worship of Venus/Aphrodite may stem from the Phoenician Astarte and Semitic Ishtar).
- Darwin, E., ref. 20, canto I, IV, lines 227–234 “Ere Time began, from flaming Chaos hurl'd, Rose the bright spheres, which form the circling world; Earths from each sun with quick explosions burst, And second planets issued from the first. Then, whilst the sea at their coeval birth, Surge over surge, involv'd the shoreless earth; Nurs'd by warm sun-beams in primeval caves, Organic Life began beneath the waves.”
- Bergman, J., Did Darwin plagiarise his evolution theory? *J. Creation* 16(3):58–63, 2002; From King-Hele, D., *Erasmus Darwin*, Charles Scribner's Sons, New York, pp. 81–89, 1963.
- Barnard, A., Staffordshire's involvement with Genesis and evolution: keeping it in the family. A talk first given to the History of Veterinary Medicine Group at Biddulph Gardens (13–05–09), developed for Biddulph Gardens' Darwin Bi-Centenary Talk (19–06–09), and then in Birmingham (01–12–09), Erasmus Darwin House, Lichfield, erasmusdarwin.org/, accessed November 2018.
- Darwin, E., ref. 13, note XV, p. 30.
- Jourdain, M., *Diderot's Early Philosophical Works*, (trans. and ed. by Jourdain. M), Introduction, The Open Court Publ. Co., Chicago & London, p. 1, 1916.
- Diderot, D., *Thoughts on the Interpretation of Nature: And other philosophical works*, (trans. & ed. by Adams, D.), Clinamen Press Ltd, Manchester, 2000; Diderot, D., *Pensees sur L'Interpretation de la Nature*, p. 92, 1754 (that millions of years passed between each of these stages—qu'il s'est écoulé des millions d'années entre chacun de ces développements).
- Darwin, E., ref. 13, note XXIV, p. 65.
- Darwin, E., ref. 13, note XVI, p. 32.
- Dean, D.R., *James Hutton and the History of Geology*, Cornell University Press, Ithaca, NY, pp 1–5, 1992.
- Geikie, A., *The Founders of Geology*, Dover Publ., New York, p. 342, 1962 (from 2nd edn, 1905).
- Taylor, K.L., Desmarest, Nicolas, *A Dictionary of Earth Sciences*, Oxford University Press, 1999, encyclopedia.com, 28 September 2018.

32. Hutton, J., *Theory of the Earth: or an investigation of the laws observable in the composition, dissolution, and restoration of land upon the globe*, Transactions of the Royal Society of Edinburgh, vol. I, part II, pp. 209–304, 1788 (from addresses given in 1785); Hutton, J., *Theory of the Earth: With proofs and illustrations*, Edinburgh, 1795.
33. Hutton, ref. 32, pp. 220 (Saussure), pp. 279–280 (Dolomieu), and, vol. I, chap. 5 (De Luc).
34. A Complete Dictionary of Scientific Biography, “Saussure, Horace Bénédict De.”, Encyclopedia.com, Charles Scribner & Sons, 2008, accessed 10 November 2018.
35. Hutton, ref. 32, p. 216.
36. Rudwick, M.J.S., *Bursting the Limits of Time: The reconstruction of geohistory in the age of revolution*, University of Chicago Press, Chicago, IL, p. 158–164, 2005.
37. Playfair, J., Illustrations of the Huttonian theory of the earth; in: *The Works of John Playfair Esq.*, vol. 1, A Constable & Co. Edinburgh, and Hurst, Robinson, 7 Co. London, pp. 472–473, 1822.
38. Rudwick, ref. 36, p. 172.
39. Hutton, ref. 32, p. 217.
40. Playfair, J., Biographical account of the later Dr James Hutton, F.R.S. Edinburgh [1803], *Proceedings of the Royal Society of Edinburgh* 5(3):39–99, 71–73, 1805.
41. Rudwick, ref. 36, p. 171.
42. Hutton, J., ref. 32, *Theory of the Earth*, vol. 1, chap. V: “But how shall we acquire the knowledge of a system calculated for millions, not of years only, nor of the ages of man, but of the races of men, and the successions of empires? ... we have nothing but the laws of nature, established in the science of man by his inductive reasoning.”
43. Rudwick, ref. 36, p. 169, from Hutton, ref. 32, p. 215, 298–299.
44. Rudwick, ref. 36, p. 161 (no. 46). See also Reed, ref. 5.
45. Gould, S.J., *Time’s Arrow Time’s Cycle: Myth and metaphor is the discovery of geological time*, Harvard University Press, Cambridge, MA, pp. 66–67, 1997.
46. Lyell, C., *Life, Letters and Journals of Sir Charles Lyell*, John Murray, London, pp. 268–271, 1881 (letter to George Poulett Scrope, 14 June 1830).
47. Grinnell, G., A probe into the origin of the 1832 Gestalt shift in geology, *Kronos: A.J. Interdisciplinary Synthesis* 1(4): 68–76, Winter 1976.
48. See: Mortenson, T., *The Church’s Catastrophic Mistake on Geology—Before Darwin*, Master Books, Green Forest, AR, 2004.
49. Keynes, R., *Fossils, Finches and Fuegians: Charles Darwin’s adventures and discoveries on the Beagle 1832–1836*, Harper Collins, London, p. 379, 2002 (letter to J.S. Henslow, 30–31 October 1836).
50. Darwin Correspondence Project, Letter no. 9105 (letter to his son George, 21 & 22 Oct 1873), darwinproject.ac.uk/DCP-LETT-9105, accessed 30 July 2018.
51. Morley, J., *The Works of Voltaire: A contemporary version*. A critique and biography by John Morley, notes by Smollett, T., trans. Fleming, W.F., E.R. DuMont, New York, vol. 11, p. 112, 1901.
52. Lyell, C., *Principles of Geology*, 9th edn, book 1, chap. 4, University of Adelaide, Adelaide, Australia, pp. 54–55, 1854. (This passage is also in early editions from 1834.)
53. Lyell, C., ref. 46, book 1, chap. 2, pp. 5–12.
54. Hume, D., *An Enquiry Concerning Human Understanding*, Hackett Publ Co., Indianapolis, IN, 1993; chapter on Cause and Effect, part II, 1772.
55. See Hutton, ref. 32, p. 215, 298–299.
56. Darwin, C., *On the Origin of Species*, 1st edn, Murray, London, pp. 282–287, 1859: “At this rate, on the above data, the denudation of the Weald must have required 306,662,400 years, or say 300 million years. But perhaps it would be safer to allow two or three inches per century, and this would reduce the number of years to 150 or 100 million years.” The Weald has been discussed by Oard, M.J. and Matthews, J.D., Erosion of the Weald, Southeast England—part I: uniformitarian mysteries, *CRSQ* 51(3):165–176, 2015; Matthews, J.D. and Oard, M.J., Erosion of the Weald, Southeast England—part II: a Flood explanation of the mystery and its implications, *CRSQ* 52(1):22–33, 2015.
57. Wilberforce, S., Review of *Origin of Species*, *Quarterly Review* 225–264, 1860. Darwin’s quote is ref. 60, p. 280.
58. Stott, R., *Darwin’s Ghosts: In search of the first evolutionists*, Bloomsbury Publ., London, pp. 1–17, 2012.
59. Darwin, C., *On the Origin of Species*, D. Appleton, New York, Preface, 1860.
60. Owen, R., Darwin on the Origin of Species, *Edinburgh Review* 3:487–532, 1860. “... individuals of more imaginative temperament; such as Demaillet in the last century, Lamarck in the first half the present, Darwin in the second half.”
61. Darwin, C., *On the Origin of Species*, 4th edn, Murray, London, p. XIII, 1866.
62. Darwin, C., *The Origin of Species*, 3rd edn, Murray, London, pp. XIV, 1872. The reference Darwin gives for *Zoonomia* (vol. I., pp. 500–510, 1794).
63. For instance, Bergman, ref. 22, and Mortenson, ref. 48, and Catchpoole, D. and Walker, T., Charles Lyell’s hidden agenda—to free science ‘from Moses’, creation.com, 19 August 2009.
64. Frengren, G.B. and Numbers, R.L., C.S. Lewis on Creation and Evolution: the Acworth letters, 1944–1960, *PSCF* 48:28–33, March 1996 (Lewis’s letter to Ackworth of 5th March 1960).

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Have uniformitarians rescued the ‘Pacemaker of the Ice Ages’ paper?

Jake Hebert

The current dominant Ice Age explanation is the astronomical, or Milankovitch, theory. This theory posits that slow changes in Earth’s rotational and orbital motions ‘pace’ the timing of ice ages by modulating the manner in which solar radiation incident on the earth is distributed with season and latitude. This theory is widely accepted because of an influential 1976 paper entitled “The Pacemaker of the Ice Ages”. However, the paper’s results were critically dependent upon an assumed age for the most recent geomagnetic reversal, an age which even uniformitarian scientists no longer accept as valid. If one re-does the calculations using the new uniformitarian age assignment, the results are greatly weakened. Although additional evidence for the Milankovitch theory seems weak, a 1997 paper seems to ‘rescue’ the results of this iconic paper. However, this ‘rescue’ may be influenced by ‘selection bias’ and arguably requires arbitrary, capricious handling of seafloor sediment data. Hence, these 1997 results are not terribly convincing.

In 2016 I published a paper showing that the well-known “Pacemaker of the Ice Ages” paper, which convinced many uniformitarians of the validity of Milankovitch climate forcing, depended upon an assumed age of 700 ka for the most recent geomagnetic reversal (the Brunhes-Matuyama magnetic reversal), despite the fact that uniformitarian scientists now claim that its age is 780 ka.^{1–3} The Pacemaker authors never explicitly stated that they were assuming the age of the Brunhes-Matuyama (B-M) reversal to be 700 ka, but a careful reading of both the Pacemaker paper itself and a 1973 paper by Nicholas Shackleton and Neil Opdyke clearly shows this to be the case.^{2,4}

In my article, I replicated the ‘frequency domain’ analysis of the original Pacemaker paper and then showed that this age revision adversely affected the published Pacemaker results.^{5,6} I also showed a method by which laypeople could verify that the most important results were at least approximately correct.⁷ An even more thorough re-analysis, taking into account further revisions to the data, undermined these results even further.⁸

Creation and secular researchers have long pointed out serious difficulties with the Milankovitch theory.^{9–12} In spite of these difficulties, many uniformitarians accept the theory largely because of analyses of paleoclimate data like that in the Pacemaker paper:

“In fact, the evidence for the role of astronomy [in climate variation] comes almost exclusively from spectral analysis. The seminal paper was published in 1976, titled, ‘Variations of [*sic*] the earth’s orbit: pacemaker of the ice ages’ (Hays *et al.*, 1976).”¹³

Largely because of the Pacemaker paper, uniformitarian scientists generally assume the Milankovitch theory to be correct and use that assumption to date sediment and ice

cores in a process called ‘orbital tuning’.¹⁴ Uniformitarian scientists even use orbital tuning to calibrate argon-argon dating standards.¹⁵ Obviously, without objective evidence to support the theory, hundreds, if not thousands, of uniformitarian age assignments are suspect, even by uniformitarian reckoning.

To the best of my knowledge, there has been no public response to my research from uniformitarian scientists or old-earth creationists. However, one paper seems to ‘rescue’ the Pacemaker results, so I feel it is important to address it. This 1997 paper, entitled “The timing of major climate terminations”, was authored by paleoclimatologist Maureen Raymo.¹⁶

Background

Secular paleoclimatologists now claim that there have been about 50 ice ages (‘glacial intervals’) during the Pleistocene (within the past 2.6 Ma).¹⁷ This claim is clearly *not* based on geological field evidence. Even if one accepts the claim of multiple ice ages, interpretation of the field data is complex,¹⁸ and glaciers in the most recent ice age would likely bulldoze and destroy much of the evidence for previous ice ages. Likewise, the geological field data do not demand multiple Pleistocene ice ages. For instance, even some secular geologists acknowledge that there is strong geological evidence in western Alberta for only the most recent ice age, which creationists would argue was the *only* Ice Age.¹⁹

Instead, this claim of 50 Pleistocene ice ages is based upon a Milankovitch interpretation of seafloor sediment oxygen isotope ‘wiggles’. For instance, Lisiecki and Raymo constructed a composite ‘stack’ of benthic $\delta^{18}\text{O}$ values from 57 deep-sea sediment cores which supposedly extended back 5.3 Ma.²⁰ If you plot just the Pleistocene part (the most recent

2.6 Ma) of this composite stack (figure 1), there are about 50 wiggly cycles. Hence, secular paleoclimatologists claim there have been 50 Pleistocene ‘glacial’ intervals.

Secular paleoclimatologists use a ‘numbering system’ called Marine Isotope Stages (MIS) to identify similar oxygen isotope patterns in different sediment cores. Generally, but with some exceptions, odd-numbered MIS correspond to presumed warmer ‘interglacials’, and even-numbered MIS correspond to presumed colder ‘glacials’. Different MIS are separated by ‘boundaries’, generally located at places where the oxygen isotope values transition from a local maximum to a local minimum.²¹ If the oxygen isotope values transition between an extreme local maximum and an extreme minimum value, then the boundary is called a ‘termination’.²²

A 1973 paper by Shackleton and Opdyke used oxygen isotope data from a far western Pacific core designated as V28-238 and an assumed age of 700 ka for the B-M reversal boundary, to assign tentative ages to 21 MIS boundaries, three of which were used in the Pacemaker paper.^{4,2}

Since the age of the B-M reversal has since been revised to 780 ka, use of Shackleton and Opdyke’s method, as well as the methodology of the Pacemaker authors, yields age estimates for the MIS boundaries that are too old to be consistent with the currently accepted version of the Milankovitch theory.

This means that this key argument for Milankovitch climate forcing is also invalid. That, in turn, means that hundreds (if not *thousands*) of orbitally tuned secular age assignments are in doubt, even by uniformitarian reckoning.

Given this state of affairs, one would not be surprised if uniformitarian scientists had at some point attempted to ‘prove’ that the currently accepted ages for the MIS boundaries are still correct, despite the fact that the *method* originally used to obtain those ages is invalid. This would

enable them to claim that the Pacemaker results no longer depend on Shackleton and Opdyke’s 1973 calculations, which would mean that those results may still be used as confirmation of the astronomical theory. Regardless of whether or not this was Raymo’s intent, her 1997 paper appears to fill this purpose.

Raymo’s methodology

Raymo used 11 oxygen isotope ($\delta^{18}\text{O}$) seafloor sediment records containing the B-M reversal boundary to determine the ages for several ‘terminations’. She used the age assignment of ~780 ka for the B-M boundary, as well as two other radioisotope age assignments, to set up simple, ‘untuned’ timescales, i.e. timescales which did not necessarily assume the Milankovitch theory to be correct, for these eleven $\delta^{18}\text{O}$ records. One of these age assignments was 13.5 ka for the Marine Isotope Stage (MIS) 2.0 boundary, also known as Termination I. The second was an age assignment of 128 ka for the MIS 6.0 boundary, also known as Termination II. The third control point was MIS boundary 19.0, which was assumed to be 6 ka younger than B-M reversal boundary. Since the age of the B-M reversal boundary was taken to be 778 ± 3.5 ka, she took the age of MIS 19.0 to be 772.2 ka. She assumed constant sedimentation rates between these three age assignments, as a first approximation, in order to set up the untuned timescales. After doing so, she obtained average estimated ages for Terminations III, IV, V, VI, and VII (MIS boundaries 8.0, 10.0, 12.0, 14.0, and 16.0, respectively). When she did so, the ages obtained for these five Terminations agreed fairly well with the age assignments obtained by orbital tuning. Raymo thus saw these results as a confirmation of the orbitally tuned SPECMAP timescale. Uniformitarians now acknowledge that the SPECMAP timescale was seriously inaccurate for (presumed) ages greater than 600 ka, although they think it is accurate for the more recent past.²³ Because Raymo’s results concerned these more recent (and presumably correct) ages, they are worth discussing here.

Of particular interest are the age assignments for Terminations III and V (MIS boundaries 8.0 and 12.0, respectively), as these were the age assignments the Pacemaker authors used, along with the age of 127-128 ka for the Termination II boundary (MIS 6.0) to set up their preliminary ‘SIMPLEX’ and ‘PATCH’ timescales. Raymo obtained a mean age estimate of 247.9 ka (standard deviation of 10.0 ka) for the MIS 8.0 boundary and a mean age estimate of 423.6 ka (standard deviation of 13.6 ka) for the MIS 12.0 boundary (table 1). By comparison,

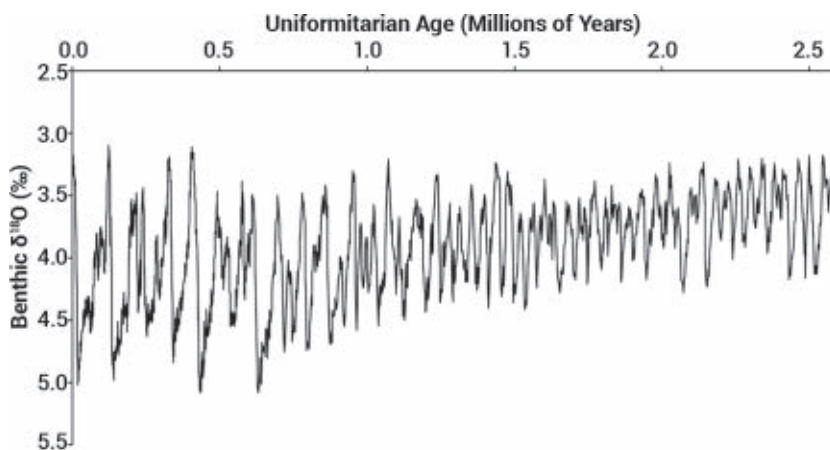


Figure 1. Because a composite oxygen isotope stack going back 2.6 Ma shows approximately 50 cycles, uniformitarian scientists claim that 50 or so glacials (ice ages, in popular speech) occurred during the Pleistocene.

the Pacemaker paper used age estimates of 251 and 440 ka, respectively, for these MIS boundaries.

Selection bias?

However, there may have been some ‘selection bias’ in Raymo’s choice of sediment cores, as she did not use all the available cores for her analysis. She excluded three sediment cores used to obtain the SPECMAP tuned timescale, even though these three cores *also* contained the B-M magnetic reversal. These were the V28-238 core, the DSDP 502 core off the coast of Central America, and the V22-174 core in the southern Atlantic. She excluded these cores because they had already been orbitally tuned and used to obtain the SPECMAP timescale. However, this does not seem like a sufficient justification for their exclusion. As long as one still has the original $\delta^{18}\text{O}$ data as a function of depth, it is certainly possible to ‘untune’ those sediment records and to then treat them like any other sediment cores. Hence Raymo could have used her methodology to obtain termination age estimates from the untuned $\delta^{18}\text{O}$ records in these three cores. Hence, it still seems odd that Raymo excluded them from her analysis. This is especially true for the V28-238 core. This core supposedly had a nearly constant sedimentation rate,²⁴ and it played a critical role in the Pacemaker paper, as this was the sediment core used by Shackleton and Opdyke in their 1973 analysis.^{4,2} In fact, the V28-238 core was so

important to uniformitarian scientists that they dubbed its oxygen isotope record an ice age ‘Rosetta Stone’!²⁵ Even though secular scientists later claimed that there was a significant discontinuity within the V28-238 core, it is possible to correct for that supposed discontinuity, and other uniformitarian scientists have done so.²⁶ Hence, Raymo still should arguably have included it in her analysis.

Apparently, the V28-238 core has ‘outlived its usefulness’. Once hailed as an ice age ‘Rosetta Stone’, it now seems to be just another ‘run-of-the-mill’ sediment core, no more important than any other of the thousands of cores in existence. Interestingly, I have never been able to find an explicit statement of *why* uniformitarian scientists believed that the sedimentation rate within the V28-238 core was nearly constant. One can’t help but wonder if this assumption was based on circular reasoning. Did uniformitarian scientists conclude that the V28-238 sedimentation rate was nearly constant because its oxygen isotope values were behaving in a fashion roughly consistent with Milankovitch assumptions? If so, they may have reasoned that variations in the sedimentation rate would have distorted this signal. Since they ‘knew’ (or strongly suspected) that the Milankovitch theory was correct, they may have viewed this ‘idealized’ $\delta^{18}\text{O}$ behaviour as confirmation of a nearly constant sedimentation rate within the V28-238 core.

Also, there are at least seven *other* sediment cores, also containing the B-M reversal boundary, which had *already*

Table 1. Estimated ages (in ka) from Raymo (1997) for Terminations III through VII (Marine Isotope Stage Boundaries 8.0, 10.0, 12.0, 14.0, and 16.0), based upon an assumed age of 128.0 ka for Termination II (MIS 6.0) and 772.6 ka for MIS 19.0, and an assumed constant sedimentation rate between those two age markers. Asterisk indicates age estimate that Raymo excluded in analysis because it was an outlier (more than two standard deviations outside the mean for that age estimate).

Site	Termination III	Termination IV	Termination V	Termination VI	Termination VII
ODP 806	249.8	336.1	418.1	515.6	623.3
V28-239	242.5	336.2	398.3	508.4	605.4
DSDP 607	210.9*	317.4	414.2	492.7	589.0
ODP 659	234.8	331.8	430.4	558.0	643.9
ODP 663	240.3	330.9	425.4	540.8	616.4
ODP 664	242.5	334.4	424.7	536.5	605.0
ODP 677	246.4	335.9	413.1	523.9	601.6
ODP 846	244.6	340.0	426.7	547.5	618.3
ODP 849	269.3	364.4	445.6	556.1	636.9
ODP 925	249.7	351.1	ambiguous	572.0	648.3
MD900963	259.4	354.0	439.3	528.5	649.0
Raymo Ave.	247.9	339.3	423.6	534.5	621.6
Raymo Std. Dev.	10.0	12.8	13.6	23.6	20.6
Shackleton & Opdyke Age	251	347	440	502	660

been used to ‘confirm’ the age of 780 ka for the B-M reversal boundary.²⁷ Moreover, this confirmation was published in 1996, just one year prior to Raymo’s paper. Since Raymo was accepting this age assignment of 780 ka as a ‘given’, it is not clear why she excluded these seven cores from her analysis. Raymo stated:

“Not included in this study are cores with unspliced core breaks, low sampling resolution, drilling disturbance, hiatuses, and/or poorly resolved or missing isotopic events.”²⁸

Presumably Raymo excluded the other seven cores because they were characterized by these defects. But if that is the case, why then were they used in the 1996 paper

to ‘confirm’ the age of 780 ka for the B-M reversal? If these defects precluded their use in Raymo’s study, shouldn’t those same defects have precluded their use in the 1996 study?

There could in fact be *many* more sediment cores containing the B-M reversal boundary in addition to these seven, which were listed in a single paper. Inclusion of these additional sediment cores would have increased the size of Raymo’s sample and could have yielded results less favourable to Milankovitch expectations. It is tempting to redo Raymo’s calculations, after including all known sediment cores containing the B-M magnetic reversal boundary, but candidly, I do not presently have the time

Table 2. Estimated ages (in ka) for Terminations III through VII (Marine Isotope Stage Boundaries 8.0, 10.0, 12.0, 14.0, and 16.0), based upon an assumed age of 128.0 ka for Termination II (MIS 6.0) and 772.6 ka for MIS 19.0, and an assumed constant sedimentation rate between those two age markers. However, the untuned age estimates from the three SPECMAP sediment cores also containing the Brunhes-Matuyama magnetic reversal boundary were included, as well as the age of 210.9 ka for Termination III from core DSDP 607. Age estimates marked ‘N/A’ (‘not applicable’) were omitted because termination locations were uncertain and partially derived from V28-238 data.³⁹

Site	Termination III	Termination IV	Termination V	Termination VI	Termination VII
ODP 806	249.8	336.1	418.1	515.6	623.3
V28-238	273.5	387.8	477.8	550.5	657.9
V28-239	242.5	336.2	398.3	508.4	605.4
V22-174	244.7	N/A	N/A	474.6	604.6
DSDP 502b	235.7	341.0	N/A	477.6	573.7
DSDP 607	210.9	317.4	414.2	492.7	589.0
ODP 659	234.8	331.8	430.4	558.0	643.9
ODP 663	240.3	330.9	425.4	540.8	616.4
ODP 664	242.5	334.4	424.7	536.5	605.0
ODP 677	246.4	335.9	413.1	523.9	601.6
ODP 846	244.6	340.0	426.7	547.5	618.3
ODP 849	269.3	364.4	445.6	556.1	636.9
ODP 925	249.7	351.1	ambiguous	572.0	648.3
MD900963	259.4	354.0	439.3	528.5	649.0
Hebert Ave.	246.0	343.2	428.5	527.3	619.5
Hebert Std. Dev.	15.3	17.8	20.8	30.3	24.9
Shackleton & Opdyke Age	251	347	440	502	660
Hebert Ave. (1 st 3 cores)	255.3	353.4	431.4	524.8	628.9
Hebert Std. Dev. (1 st 3 cores)	16.2	29.8	41.4	22.5	26.7
Shackleton & Opdyke Age	251	347	440	502	660

or energy to ‘hunt’ for all these data cores and to perform such an analysis. However, I *did* re-do her calculations for the ages of the terminations after including the three SPECMAP cores that she excluded (table 2). In obtaining the average age estimates for each termination, I gave ages from each core equal weight. Including the age estimates from these three cores generally increased the ‘spread’ in the age estimates. Of particular interest are the age estimates obtained from the first three cores in table 2, the V28-238, V28-239, and ODP-806 cores. These three cores are located very close to one another in the far western Pacific.

Hence, one might expect all three cores to yield similar age estimates for the MIS boundaries, with a smaller standard deviation than that obtained using all 14 cores. In fact, the standard deviation for these three cores were generally larger than those obtained for the whole set. Interestingly, the standard deviation for Termination V (MIS 12.0) obtained from these three cores (41.1 ka) is *twice* that obtained from the whole set (20.8 ka).

It is also worth noting that Raymo stated that she used records that “exhibit the *typical sequence of oxygen isotope stages* with no obvious hiatuses, drilling disturbance, or large swings in sedimentation rates [emphasis added].”²⁸ This itself may have been a subtle example of selection bias—what does a ‘typical’ oxygen isotope record look like? Uniformitarian scientists think that an ideal, undistorted oxygen isotope record shows a ‘sawtooth’ pattern, indicative of slow buildup of the ice sheets, followed by rapid collapse of those ice sheets. For instance, see figure 2, which shows the most recent part of the SPECMAP orbitally tuned oxygen isotope record, plotted as a function of (uniformitarian) time. If one compares the uppermost 12.5 m of Raymo’s oxygen isotope graphs (plotted as a function of *depth*) in her figure 1 with a graph of the SPECMAP oxygen isotope record, plotted as a function of *time*, there is a striking similarity. In other words, assumed uniformitarian age is roughly proportional to depth if one uses sediment cores containing the ‘expected’ $\delta^{18}\text{O}$ pattern. Hence, by choosing cores whose $\delta^{18}\text{O}$ records (in the spatial domain) generally looked like the SPECMAP $\delta^{18}\text{O}$ record (in the time domain), she may have unconsciously biased the results to agree with the SPECMAP timescale. As of 26 September 2018, Raymo’s paper can be freely accessed online.²⁹

Remember also that the very choice of which peak or trough is designated as a particular MIS $\delta^{18}\text{O}$ feature is somewhat subjective. Since secular paleoclimatologists are expecting the MIS boundaries to occur at certain relative

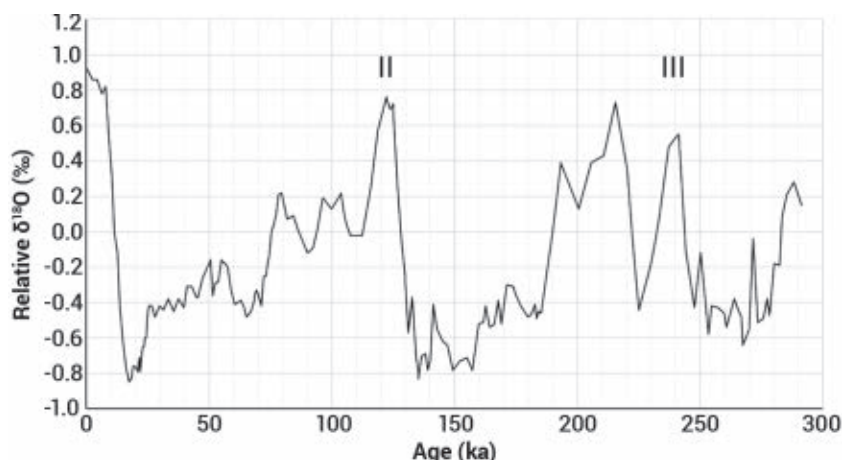


Figure 2. The most recent part of the orbitally tuned SPECMAP oxygen isotope record, with Terminations II and III indicated (SPECMAP data obtained from Martinson *et al.*⁴⁰)

depths/times, they will choose MIS features that already correspond to their expectations.

So, do Raymo’s results salvage the Pacemaker paper?

Salvaging the Pacemaker results?

Superficially, it seems that they do. Raymo did not actually reperform the Pacemaker analysis using these new age assignments. However, one can use the ‘shortcut’ method described previously to estimate the effect that these age revisions would have on the original Pacemaker results. Her age estimate for the MIS 12.0 boundary could easily be (plus or minus one standard deviation) as low as 410 ka or as high as 437 ka. Remember that she also took the age of the MIS 6.0 boundary to be 128 ka.

If one uses the versions of the core data used in the original Pacemaker paper (yes, multiple versions of some of the same data sets exist!), then the results from the shorter RC11-120 core would be essentially unaffected, as the age estimate of 128 ka for the MIS 6.0 boundary is almost identical to the age estimate of 127 ka used by the Pacemaker authors. Likewise, if one uses the higher age estimate of 437 ka for the MIS 12.0 boundary, the results for the longer E49-18 core will be very similar to the results that the Pacemaker authors obtained using an age estimate of 440 ka for this boundary. If one uses an age of 410 ka for this boundary, then one can show that the total time assigned to the E49-18 core will be 358 ka, which is 90% of the original time of 363 ka that the Pacemaker authors assigned to it. This means that the periods obtained from spectral analysis of the core data will be about 90% of the periods reported in the Pacemaker paper. Since most of the periods for the E49-18 core were on the ‘high’ side, this actually *improves* the E49-18 spectral results, bringing them into closer agreement with Milankovitch expectations.

Likewise, re-performing the spectral analysis for the so-called ‘PATCH’ composite data sets yields good agreement with Milankovitch expectations when one uses SPECMAP

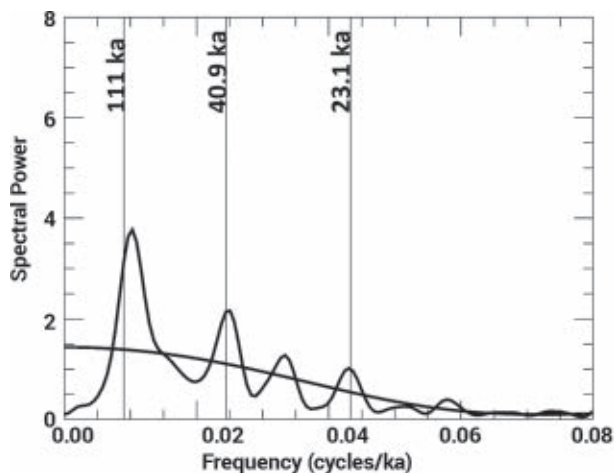


Figure 3. PATCH sea surface temperature (SST) spectral results using ages for MIS boundaries obtained from the SPECMAP timescale. Results were obtained with n (number of data points) equal to 236 and m (the truncation point) equal to 130. Null continuum obtained with m equal to 9.

ages for the relevant MIS boundaries (figures 3, 4, and 5). Furthermore, the results are generally statistically significant. Of course, since the SPECMAP timescale is orbitally tuned, it implicitly assumes the validity of the Milankovitch theory. Hence, agreement with the theory is hardly surprising.

Of course, these results salvage the Pacemaker paper only if one ignores the issues raised above.

Shedding light on the issue

Of course, uniformitarians could bring some real clarity to this issue if they would simply state clearly, and *on-the-record*, whether they still think the sedimentation rate for the V28-238 core was nearly constant. One strongly suspects that they will not do so, because either a *yes* or *no* answer is problematic for them. If they say *yes*, then by their reckoning the methodology used in the Pacemaker paper is still valid, but they need to re-do the Pacemaker results taking into account the age revision to the B-M reversal boundary. I have already shown that this revision adversely affects the Pacemaker results, and even more so when one removes an ostensibly ‘stretched’ 30 cm core section.^{6,8} Likewise, a constant sedimentation rate for the V28-238 core would imply that Raymo *should* have used it in her analysis and arguably should have given greater statistical weight to the (untuned) age estimates she obtained from it. On the other hand, if they answer *no*, they are tacitly acknowledging that the methodology used explicitly in Shackleton and Opdyke’s 1973 paper, and implicitly in the 1976 Pacemaker paper, was flawed from the beginning. In that case the Pacemaker paper should never have been published in the first place! Of course, without the Pacemaker paper, there would have been no justification for orbital tuning, nor for an orbitally tuned

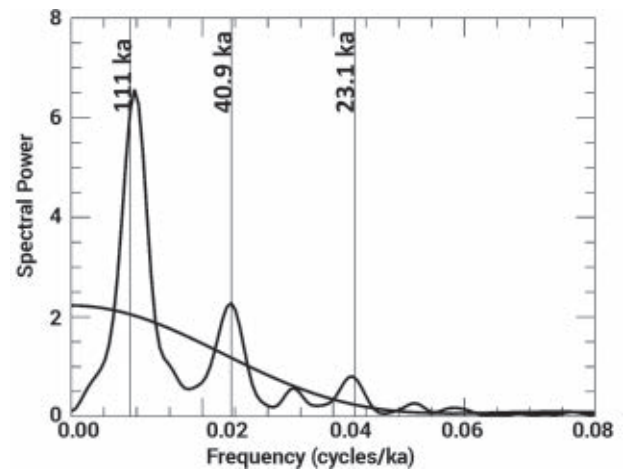


Figure 4. PATCH oxygen isotope spectral results using ages for MIS boundaries obtained from the SPECMAP timescale. Results were obtained with n (number of data points) equal to 236 and m (the truncation point) equal to 130. Null continuum obtained with m equal to 9.

SPECMAP timescale, nor for an after-the-fact ‘confirmation’ of that SPECMAP timescale.

‘Confirmation’ of the revised reversal age?

Uniformitarians claim that radioisotope dating ‘confirmed’ the new age of 780 ka for the B-M reversal boundary, but this claim is not terribly convincing.^{30–32} By 1979 uniformitarians had already revised the age of the B-M reversal from 700 to 730 ka. They based this revision on revised K-Ar decay constants and an increase in available data, so this revision does not appear to have been motivated by circular reasoning *per se*.³³ However, in the early 1990s uniformitarian scientists arbitrarily overruled this age estimate of 730 ka for the B-M reversal boundary, recommending that it be changed to 780 ka.^{3,34} The motivation for this revision was apparently to ‘protect’ the Milankovitch theory from falsification. Uniformitarian scientists were attempting to ‘orbitally tune’ sediment data from *other* sediment cores and were apparently having difficulty doing so, given the then-accepted ages for the most recent magnetic reversals, including the B-M reversal. This is actually rather remarkable, because the orbital tuning process usually gives considerable ‘wiggle room’ (pun intended!) to the tuner. Even computer-generated random wiggle patterns have been successfully tuned to the Milankovitch theory, even though the computer-generated wiggle patterns had nothing to do with the real world!^{35,36} Rather than simply conceding that the Milankovitch theory was incapable of fitting all the available data, they revised upward the ages for the most recent reversals, including the B-M reversal. *That* revision is definitely an example of circular reasoning!

However, uniformitarians soon claimed that this new age of 780 ka for the B-M reversal boundary was ‘confirmed’

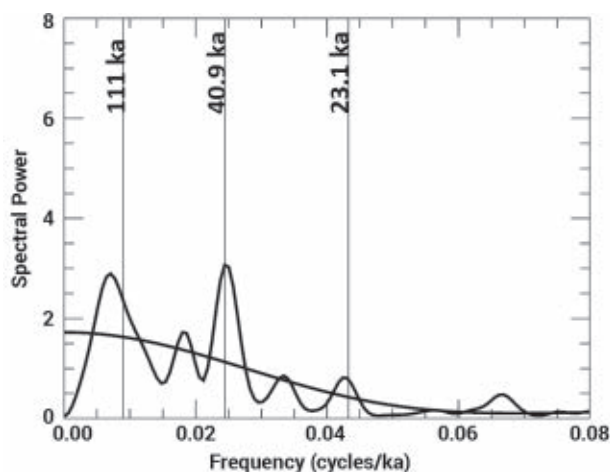


Figure 5. PATCH 'Percent *C. davisiana*' spectral results using ages for MIS boundaries obtained from the SPECMAP timescale. Results were obtained with n (number of data points) equal to 236 and m (the truncation point) equal to 130. Null continuum obtained with m equal to 9.

by K-Ar dating.³⁷ Yet one can't help but suspect that the Milankovitch theory was subtly influencing their analysis of the data. For instance, uniformitarians obtained their 1979 age estimate of 730 ka for the B-M reversal (as well as two other reversals) using K-Ar ages for volcanic rocks containing magnetic reversal data. The authors used a statistical technique that minimized inconsistencies in the estimated dates for the magnetic reversals.³² One of the papers 'confirmed' the new age estimate of 780 ka using the same method, but after including higher age estimates excluded from the original 1979 analysis.³⁰ The inclusion of these higher ages naturally 'nudged' the age of the B-M reversal to a higher value, thereby 'confirming' the new estimate!

Of course, this change to the age of the B-M reversal boundary endangered the original Pacemaker results, without which there was no justification for orbital tuning in the first place!

How firm a foundation—or not

One gets the impression that uniformitarians have been handling the seafloor sediment data in a rather capricious and arbitrary manner. One also gets the impression that they are simply unwilling to allow the Milankovitch theory to be falsified.

Although Raymo does not explicitly mention the adverse effect that the B-M age revision has on the Pacemaker results, she does allude to concerns that orbital tuning involves 'bias', i.e. circular reasoning.³⁸ Reading between the lines, one can't help but wonder if the 1997 Raymo paper, published just five years after K-Ar dating supposedly 'confirmed' the new age of 780 ka for the B-M reversal, was an attempt at 'foundation repair' for the Pacemaker paper (figure 6). The Pacemaker results rested on the results of Shackleton and Opdyke's 1973 paper. With those results invalidated, uniformitarians had an obvious need to 'prop' up the Pacemaker paper in order to prevent the entire orbital tuning enterprise from collapsing into a heap of ruins!

Whether or not one considers Raymo's 'confirmation' of the SPECMAP timescale to be convincing depends largely upon one's bias. Obviously, as a creation researcher, I am strongly biased against the Milankovitch theory and the SPECMAP timescale. However, I can't help but wonder how others, including uniformitarians who are not necessarily convinced of the Milankovitch theory, would view this apparent 'after-the-fact' justification for the Pacemaker results. How would he respond if a Milankovitch enthusiast were to candidly tell him:

"The original confirmation of the Milankovitch theory was flawed because we later changed an age estimate that was crucial to the results. In fact, we changed this age estimate because we were having trouble reconciling *other* data with the Milankovitch theory, so rather than simply admit the theory was wrong, we overruled our own radioisotope age estimates in order to make the data 'fit' the theory. But it's OK now, because we have since managed to justify

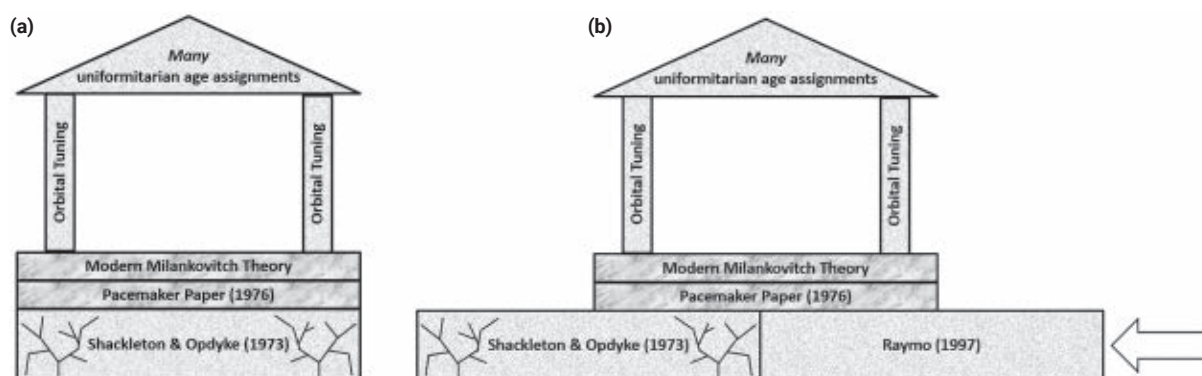


Figure 6. (a) Because of the revised age for the B-M reversal boundary, the 1973 Shackleton and Opdyke results are invalid, which means that the Pacemaker results (and the Milankovitch theory) are on a shaky foundation. But the 1997 Raymo paper (b) appears to be an attempt to 'prop up' the Pacemaker paper.

the original results using data from *other* sediment cores, twenty-one years after the fact!”

Of course, when one puts it like *that*, it sounds rather silly, which is perhaps why we don’t see such candid admissions by Milankovitch proponents in the technical literature!

References

- Hebert, J., Revisiting an iconic argument for Milankovitch climate forcing: should the ‘Pacemaker of the Ice Ages’ paper be retracted?—part 1, *Answers Research J.* 9:25–56, 2016.
- Hayes, J.D., Imbrie, J., and Shackleton, N.J., Variations in the earth’s orbit: Pacemaker of the ice ages, *Science* 194 (4270):1121–1132, 1976.
- Shackleton, N.J., Berger, A., and Peltier, W.R., An alternative astronomical calibration of the lower Pleistocene timescale based on ODP Site 677, *Transactions of the Royal Society of Edinburgh: Earth Sciences* 81(4):251–261, 1990.
- Shackleton, N.J. and Opdyke, N.D., Oxygen isotope and palaeomagnetic stratigraphy of Equatorial Pacific Core V28-238: oxygen isotope temperatures and ice volumes on a 10⁵ Year and 10⁶ Year Scale, *Quaternary Research* 3:39–55, 1973.
- Hebert, J., Revisiting an iconic argument for Milankovitch climate forcing: should the ‘Pacemaker of the Ice Ages’ paper be retracted?—part 2, *Answers Research J.* 9:131–147, 2016.
- Hebert, J., Revisiting an iconic argument for Milankovitch climate forcing: should the ‘Pacemaker of the Ice Ages’ paper be retracted?—part 3, *Answers Research J.* 9:229–255, 2016.
- Hebert, J., A broken climate pacemaker?—part 1, *J. Creation* 31(1):88–98, 2017.
- Hebert, J., The ‘Pacemaker of the Ice Ages’ paper revisited: closing a loophole in the refutation of a key argument for Milankovitch climate forcing, *CRSQ* 54:133–148, 2017.
- Cronin, T.M., *Paleoclimates: Understanding climate change past and present*, Columbia University Press, New York, pp. 130–139, 2010.
- Oard, M.J., Astronomical troubles for the astronomical hypothesis of ice ages, *J. Creation* 21(3):19–23, 2007.
- Winograd, I.J., Coplen, T.B., Landwehr, J.M. *et al.*, Continuous 500,000-year climate record from vein calcite in Devils Hole, Nevada, *Science* 258(5080):255–260, 1992.
- Muller, R.A. and MacDonald, G.J., Spectrum of 100-kyr glacial cycle: orbital inclination, not eccentricity, *PNAS* 94:8329–8334, 1997.
- Muller, R.A. and MacDonald, G.J., *Ice Ages and Astronomical Causes: Data, spectral analysis and mechanisms*, Praxis Publishing, Chichester, UK, p. xiv, 2000.
- Hebert, J., The dating ‘pedigree’ of seafloor sediment core MD97-2120: a case study, *CRSQ* 51(3):152–164, 2015.
- Hebert, J., Circular reasoning in the dating of deep seafloor sediments and ice cores: the orbital tuning method, *Answers Research J.* 7:297–309, 2014.
- Raymo, M.E., The timing of major climate terminations, *Paleoceanography* 12(4):577–585, 1997.
- Walker, M. and Lowe, J., Quaternary science 2007: a 50-year retrospective, *J. Geological Society, London* 164:1073–1092, 2007.
- Oard, M.J., *An Ice Age Caused by the Genesis Flood*, Institute for Creation Research, El Cajon, CA, pp. 135–139, 1990.
- Oard, M.J., Only one glaciation observed in western Alberta, Canada—the ice-age reinforcement syndrome, *J. Creation* 29(2):12–13, 2015.
- Lisiecki, L.E. and Raymo, M.E., A Pliocene-Pleistocene stack of 57 globally distributed benthic $\delta^{18}\text{O}$ records, *Paleoceanography* 20, PA1003, 2005.
- Gibbard, P.L., Climatostratigraphy; in: Elias, S.A. (Ed.), *Encyclopedia of Quaternary Science*, Elsevier, Amsterdam, pp. 2819–2825, quoted in modified form by the INQUA Commission on Stratigraphy and Chronology, 2007, inqua-saccomm.org/stratigraphic-guide/climatostratigraphy-geological-climate-stratigraphy/, accessed 23 April 2015.
- Broecker, W.S., Terminations, in Milankovitch and Climate, part 2, Berger A., *et al.* (Ed.), D. Reidel Publishing, Norwell, MA, pp. 687–698, 1984, cited in Raymo, ref. 16.
- Muller and MacDonald, ref. 13, pp. 149–150.
- Shackleton, Berger, and Peltier, ref. 3, p. 258.
- Woodward, J., *The Ice Age: A very short introduction*, Oxford University Press, Oxford, p. 97, 2014.
- Prell, W.L., Imbrie, J., Martinson, D.G. *et al.*, Graphic correlation of oxygen isotope stratigraphy application to the late Quaternary, *Paleoceanography* 1(2):137–162, 1986.
- Tauke, L., Herbert, T., Shackleton, N.J., and Kok, Y.S., Astronomical calibration of the Matuyama-Brunhes boundary: consequences for magnetic remanence acquisition in marine carbonates and the Asian loess sequences, *Earth and Planetary Science Letters* 140:133–146, 1996.
- Raymo, ref. 16, p. 578.
- agupubs.onlinelibrary.wiley.com/doi/epdf/10.1029/97PA01169
- Tauke, L., Deino, A.D., Behrensmeier, A.K., and Potts, R., Pinning down the Brunhes/Matuyama and upper Jaramillo boundaries: a reconciliation of orbital and isotopic time scales, *Earth and Planetary Science Letters* 109:561–572, 1992.
- Spell, T.L. and McDougall, I., Revisions to the age of the Brunhes-Matuyama boundary and the Pleistocene geomagnetic polarity timescale, *Geophysical Research Letters* 19(12):1181–1184, 1992.
- Baksi, A.K., Hsu, V., McWilliams, M.O., and Farrar, E., ⁴⁰Ar/³⁹Ar dating of the Brunhes-Matuyama geomagnetic field reversal, *Science* 256(5055):356–357, 1992.
- Mankinen, E.A. and Dalrymple, G.B., Revised geomagnetic polarity time scale for the interval 0–5 m.y. B.P., *J. Geophysical Research* 84(B2):615–626, 1979.
- Hilgen, F.J., Astronomical calibration of Gauss to Matuyama Sappropels in the Mediterranean and implication for the geomagnetic polarity time scale, *Earth and Planetary Science Letters* 104(2–4):226–244, 1991.
- Blaauw, M., Out of tune: the dangers of aligning proxy archives, *Quaternary Science Reviews* 36:38–49, 2010.
- Blaauw, M., Bennett, K.D., and Christen, J.A., Random walk simulations of fossil proxy data, *The Holocene* 20(4):645–649, 2010.
- Herbert, T.D., *Paleoceanography: orbitally tuned timescales*; in: Steele, J.H. (Ed.), *Climates and Oceans*, Academic Press, Amsterdam, The Netherlands, p. 374, 2010.
- Raymo, ref. 16, p. 577.
- Imbrie, J., Hays, J.D., Martinson, D.G. *et al.*, The orbital theory of Pleistocene climate: support from a revised chronology of the marine $\delta^{18}\text{O}$ record; in: Berger, A., Imbrie, J., Hays, J., Kukla, G., and Saltzman, B. (Eds.), *Milankovitch and Climate, part 1*, D. Reidel Publishing, Dordrecht, Holland, pp. 269–305, 1984.
- Martinson, D.G., Pisias, N.G., Hays, J.D., Imbrie, J.D., Moore, T.C., and Shackleton, N., (Table 2) SPECMAP stack of stable oxygen isotopes covering the last 300,000 years, PANGAEA, |doi.pangaea.de/10.1594/PANGAEA.56039?format=html#download. Supplement to Martinson *et al.*, Age dating and the orbital theory of the ice ages: development of a high-resolution 0 to 300,000-year chronostratigraphy, *Quaternary Research* 27:1–29, 1987.

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Patriarchal drive in the early post-Flood population

Robert W. Carter

It has already been established that the number of mutations passed to children scales with the age of the father. Yet, the oldest fathers in modern world history lived immediately after the Flood. Thus, a large mutation burden should have been added to the human population in the early years post-Flood, when the population was still relatively small and while the Patriarchs were still alive and fathering children. The genetic effects of long-lived men having children in a rapidly growing population is called *patriarchal drive*. Here, an attempt at quantifying the effects of patriarchal drive was performed using a computer model of human population growth. Since there are multiple unknowns, three different mutation models and several different growth models were applied and analyzed. The results indicate that patriarchal drive is a real effect and that the 'molecular clock' would have ticked much faster in the first few centuries after the Flood than it does today. This could potentially explain multiple confounding aspects of the human Y chromosome phylogenetic tree. Specifically, the inner-most branches are not necessarily the result of a slow accumulation of mutations over long periods of time but a high early mutation rate. In other words, we would expect long branches to form quickly during this one critical period in human history. In fact, the biblical model would predict the shape of the tree in many significant ways.

The book of Genesis gives us a clear picture of human history. Specifically, Genesis 9:18–19 claims that all people alive today descend from Noah's family. In the Table of Nations (Genesis 10), we see a genealogical description of multiple people groups who lived within a few hundred miles of the author. And in Genesis 11 we have a chronogenealogy that gives us not just the names but also the lifespans and the age of each Patriarch when the next generation is born.¹ This is invaluable information, and we can use it to shape our expectations of the size and mutation burden of the modern world population.^{2,3}

Yet, mutation rate studies have not yielded the 'true' mutation rate, even though it is of critical interest. Modern sequencing projects (e.g. 1,000 Genomes) use high-throughput techniques that create vast amounts of short sequence reads that then need to be run through sophisticated algorithms to produce an alignment. With a high enough coverage, sequencing errors can be averaged out. But very often low coverage data is instead compared to a standard (e.g. the already-assembled human genome). This provides great information for large-scale genomic features like inversions and large indels, but, due to the inherent error rate of the DNA polymerases used to generate the short reads, it is impossible to infer the real mutation rate from the data. Some authors have gone so far as to use a 'fixed' date in secular archaeology (e.g. the peopling of the Americas) and then call it a 'sanity check' for any mutation rate calibrations.⁴

For these and other reasons, the Y chromosome mutation rate has had various estimates.^{5,6} Helgason *et al.*⁶ reported a rate of 8.71×10^{-10} per nucleotide site, per person, per year for

the Y chromosomes of a selection of Icelandic males. This translates to 3.14×10^{-8} per site, per person, per generation, using a 36-year generation time.⁷ Given a sequenced portion of the Y chromosome of approximately 30 million bases, this amounts to just under 1 mutation (0.942) per person per generation, in modern Icelandic males. This is probably not a good proxy for the mutation rate of all men, across the world, throughout all human history, but it is all we have to go on at present. In biblical history there have been only a few hundred generations. At this assumed mutation rate, it might be possible to explain the history of the majority of extant Y chromosome lineages (figure 1). However, specific lineages (e.g. some rare lineages found in Africa) have accumulated enough mutations to make them difficult to explain with the modern mutation rate alone, so further analysis is required. Denisovans and Neandertals (see Discussion), which are expected to be as different in their Y chromosomes as they are in the rest of their genomes, are a separate case that will require additional modelling and brainstorming. They could be the result of an extreme form of what is being discussed in this paper, or the data could be spurious (less likely over time as more ancient genomes are sequenced), or some not-yet-discovered factor could be at play.

Can we estimate the Y chromosome mutation rate in long-lived ancient men? During human development, spermatogonia undergo more cellular division than eggs. But eggs also remain in an undivided state until fertilization several decades later. In men, however, the germ cells start dividing rapidly at puberty and continue to divide until the man's death. This simple difference between sperm and egg

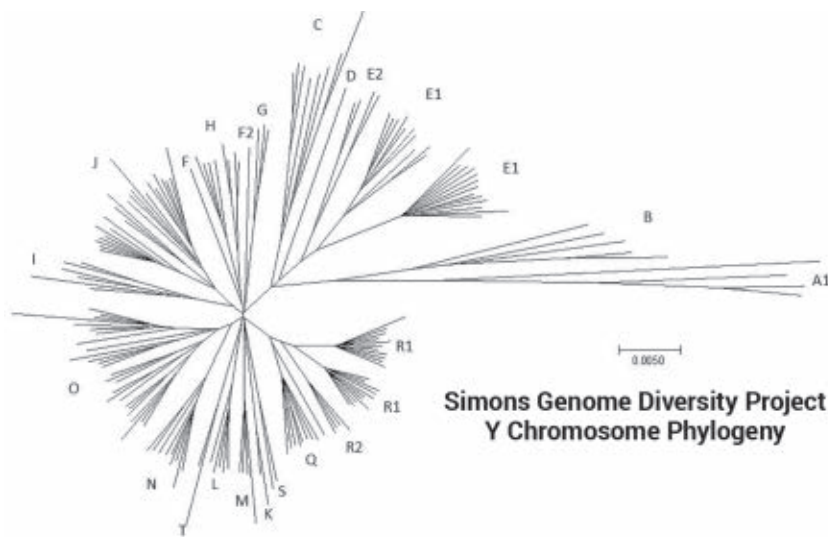


Figure 1. An unrooted neighbour-joining phylogenetic tree of the Y chromosomes, based on the Simons Genome Diversity Project (SGDP) data (from Carter, Lee, and Sanford 2018). SGDP attempted to sample from a wide range of peoples. The result is a tree that is a good representation of total worldwide Y chromosome diversity. Note the clear central ‘starburst’, and the irregular branches that display more mutations than close kin. In this ‘unrooted’ tree, branches are allowed to spread out naturally. The evolutionary root would be located midway along the ‘A1’ branch. Forcing a root at that point would produce the squared-off ‘stairstep’ tree perhaps more familiar to the majority of readers, with long spidery branches leading to a few rare African lineages. But this unrooted representation allows for a more natural reading of the data.

production produces different mutation patterns from the maternal and paternal sides.⁸ It also means more mutations are expected to come from the father than the mother.⁹ But this rate should also scale with paternal age. This is of singular importance for biblical models of human history, where great ages of the early generations are inherent.

The paternal age effect is well known.^{10,11} Not only do sperm display increased genomic decay with age on the gross architectural level,¹² but sequencing reveals that the mutation burden increases with the age of the father. The effect also appears non-linear.¹³ Yet, we have zero opportunity to test it in men with ‘biblical’ ages of several centuries, meaning we can only speculate about the mutational burden given to us from Noah and his children and grandchildren. From studies of modern men, we have learned that differences can arise in different spermatogonial lineages within a single man, meaning one parent can produce greatly differing offspring,¹⁴ depending on which spermatogonial lineage contributed to each child. In fact, some spermatogonial lineages can ‘take over’ in an almost cancer-like or selection-like scenario.¹⁵ This might have an analog in the mutator strain hypothesis and the non-clocklike mutation accumulation at essentially every scale in the Y chromosome phylogenetic tree.^{16,17} It also means that Shem, Ham, and Japheth could have received very dissimilar Y chromosomes from Noah, or that one of the brothers could have been quite different from the other two. There is no reason to expect every male to receive the same

number of mutations, but there is every reason to expect centuries-old men to pass on many times more mutations than the modern average.

Yet, nearly all mutations that occur today are lost to random drift.¹⁸ The probability of any man giving rise to a brand-new major branch of the Y chromosome family tree is exceedingly remote. But the potential ‘impact’ of any new mutation is the inverse of the population size. That is, in an exponentially growing population, the percentage of individuals expected to carry an allele at time $t + 1$ is about the same as the percentage carrying it at time t . This is of utmost importance when discussing the post-Flood world. The probability of a new lineage forming is greater when the population is small, but this is also the time when the Patriarchs are alive and fathering children.

Carter, Lee, and Sanford¹⁴ introduced the term ‘patriarchal drive’ in their study of modern human Y chromosomes and mitochondrial DNA. This is defined as the genetic effects of long-lived people in a small population who become parents at great ages. But what effect might they have? That would depend on the immediate post-Flood mutation rate and how it scales with the father’s age, the rate of early population growth, and how evenly distributed the children were within the population. In other words, if a ruling class developed early, they could easily have suppressed reproductive output among the lower classes. We see evidence for this even late in history. For example, about one in five men from Northern Ireland (including this author) share a Y chromosome lineage that is associated with the Uí Néill clan, which may or may not trace their ancestry to a 6th century Irish chieftain named Niall of the Nine Hostages.¹⁹ Another example is that of Genghis Khan, who lived in the 13th century but is ancestor of perhaps 0.5% of the modern world population.²⁰ Over time, even a slightly favourable reproductive advantage among one group would have been profound, effectively reducing the male population size to much less than the real size. In fact, it might be assumed that the longest-lived men in the population, those with the fewest number of generations from Noah, would more often become princes and rulers, and thus have an advantage over the majority of other males.

We also know that there are statistically significant differences in branch lengths among multiple Y chromosome groups that had a clear common ancestor.¹⁴ Thus, throughout

human history the ‘molecular clock’ has not ticked at the same rate across time and geography. How much of the discrepancy could be due to paternal drive? Some, but certainly not all. Figure 1 shows multiple individuals that have longer branch lengths (i.e. more mutations) than closely related contemporaries (going counterclockwise, examples can be seen in groups C, G, I, O, T, M, and K). These differences have arisen in recent history, well after the Patriarchs were deceased. And yet, the results of the current study predict that long branches can form quickly and early. Putting these two things together tells us that the molecular clock simply cannot be trusted.

But there are numerous unknowns in this discussion. In fact, we know nothing about most of the important variables. Thus, we need a flexible model if we are going to test the effects of patriarchal drive in the early post-Flood world. Yet, several biblical population models have already been developed.^{2, 21–23} These have been shown to be both useful and realistic. The only thing required would be to add a model of mutation accumulation and track the ancestry of each individual. There is no need to force the model to generate evidence of patriarchal drive. If the effect is real, it should appear naturally, once the proper factors are being measured, within the models already in existence.

Methods

Working from the models of Carter and Hardy²¹ and Carter and Powell,² a new model, written in Perl, was developed that allowed for the tracking of mutations in a post-Flood-like population. Other than the ages of paternity and total lifespan of a few individuals, almost nothing is known about the life history parameters of the early post-Flood population. Thus, three contrasting mutation models were developed to bracket the most likely possibilities (figure 2). All models assume that at least one mutation will be passed from father to son each generation. Model 1 is a simple linear model where the number of Y chromosome mutations equals the father’s age, less 20 years to allow for a prepubescent period of dormancy [$y = 1 + \text{age} - 20$]. This creates unrealistically high mutation rates at young ages. Model 2 is another linear model using the factor of ‘2 extra mutations per extra year of father’s paternity’ from Kong *et al.*,²⁴ but also assumes that only 1% of all mutations will occur on the Y chromosome [$y = 1 + (\text{age} - 20) \times 0.02$]. This fixes the problem with Model 1 at young ages, but almost certainly under-represents the

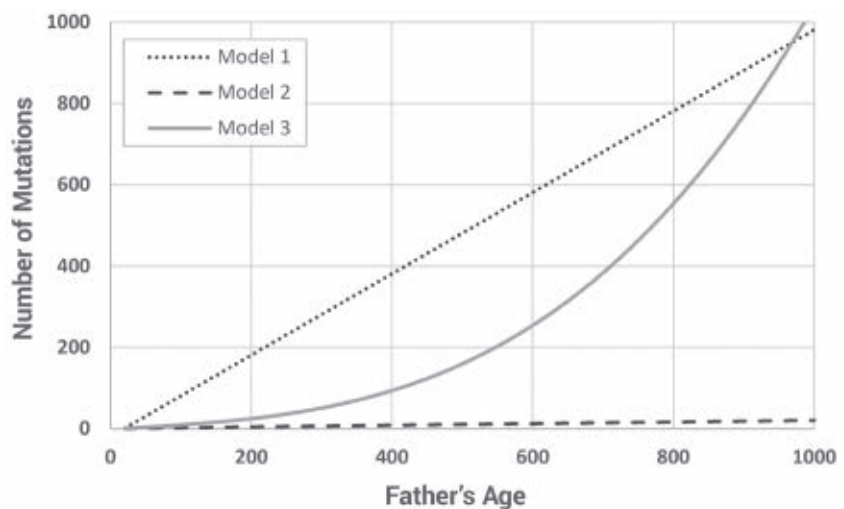


Figure 2. The three contrasting mutation models used in this paper

mutation rate at high ages. Model 3 is a polynomial model developed as a best guess of the expected mutation curve [$y = 1 + (\text{age} - 20)/10 + ((\text{age} - 20)/100)^3$]. This produces normal values in the known age ranges (paternal ages of 20 through 50 produce from one to four Y chromosome mutations in the son) and exponentially increasing mutation counts in the ‘biblical’ age categories.

Starting parameters

The model started with three reproducing couples. Each founding individual was already 100 years old and lived for another 500 years, approximating the age of Shem at the Flood and his total lifespan.²⁵ The starting number of mutations depended on the mutation model and the simplifying assumption that Noah was 500 when the three sons were born. Basic parameters are given in table 1.

An age of maturity started the mutation clock. People could get married after this. Children could be born the next year. Minimum spacing between children was set to 15 years. This sounds extreme, but population growth had to be slowed to better simulate real-world expectations (i.e. the

Table 1. Basic population parameters. All model runs discussed in this paper use these numbers unless specifically noted otherwise.

Max N	10,000
Years	2,000
Max lifespan	600
Min lifespan	80
Maturity	20
Min spacing	15

world population did not reach multiple billions of people until modern times), even though this meant each couple had fewer children. To reduce ‘cohort’ effects where all people of a certain age are having children simultaneously, the probability of a child being born after the minimum spacing was exceeded was set to $\frac{1}{3}$ per year.

Lifespan reduction

Each subsequent generation lived 85% as long as the previous generation (average of mother’s and father’s maximum lifespan $\times 0.85$), with a minimum lifespan of 80 years. This reduction rate was chosen to reflect the rate of lifespan reduction after the Flood: from Shem to Joseph, each subsequent generation had an average lifespan of 88% ($\pm 23\%$ SD) of the previous one. There is a high variance to these numbers, with three generations living longer than the generation prior to it. Attempts were made to develop a lifespan reduction model based on year of birth, cumulative age of paternity at birth, etc., but the 85% approximation was chosen because it is both simple and intuitive. Even though modern people often live longer than 80 years, and many ancient people did as well, men tend to not have many children at high ages, so a maximum lifespan of 80 seemed like a reasonable compromise. The age of menopause for females was set at 80% of total lifespan, for simplicity. One final assumption of the model was that menopausal women did not get remarried after the death of their husband, but widowers could get remarried and continue to have children up to the year of their death.

Mutation accumulation

Mutations were assigned to each child when it was born based on the age of the father only and according to the formulas for the chosen mutation model (figure 2).

Generational penalties

To mimic an assumed reproductive advantage for men fewer generations removed from Noah, a generational penalty was assigned to each birth. A list of children to be born each year was generated. For each child, a random number was assigned based on the paternal generation count of the father from Noah—e.g. ‘rand (paternal_generations)’. This provided a 15-digit floating-point number between 0 and the generation count. Men with fewer generations had a higher chance of obtaining a smaller number than men of later generations. After sorting, a preset percentage of the children were allowed to be born. A 50% cut-off generally drove the population extinct. The model runs reported in this paper allowed for 75% of all slated births to go through. Allowing for 100% removed the generational penalty entirely.

Birth replacement

Since this project was performed on a personal laptop, computer processing needs had to be kept to a minimum. The CPU clock rate (2.7 GHz) was not a critical requirement, as long as the models did not take many hours to finish, but available RAM (12.0 GB) was. Thus, the most important factor was the number of individuals being tracked. Carter and Hardy (2015) and Carter and Powell (2016) showed that populations of 5,000 or more individuals were a good approximation of any larger population size. A maximum population size was assigned for each model run, equal to 10,000 individuals for the results presented in this paper. When the population reached this size, a random individual was chosen to be overwritten each time a baby was born. High replacement levels increased the likelihood that Patriarchs could be lost, but this was held in check by the rapidly reducing lifespans (natural deaths made room for babies) and slower population growth rates (figure 3). The presence of replacement added a random component and meant there was no need to follow a life history table for the calculation of random deaths (cf. Carter and Hardy 2015). A model that did not end prematurely due to population extinction always had some replacement. If birth spacing was too large (e.g. a minimum of 20 years between births) the population would begin to decline after the long-lived Patriarchs died off. Thus, the goal was to always have a net excess of births in order to model a robust, growing population.

Artificial chromosomes

Since the paternity of each male in the model was known, it was possible to create artificial chromosomes that tracked the entire population history. For each model run, an array with n rows and 100,000 columns was created and all values were initialized to zero. A position counter incremented for each new mutation in the population. If at any time the total number of mutations exceeded the width of the array, an extra 1,000 bits were added to each row and initialized to zero. When a boy was born, his father’s row was copied to his. He then received X new mutations, so X bits were set to 1, starting at the last position + 1. In this way, every column in the array contained a unique mutation inherited from a specific ancestor. At the end of the run, the array was translated into a pseudoDNA sequence (each 0 was translated into an *A* and each 1 was translated into a *G*), and the data were saved in FASTA format. The three founding male ancestors were assigned a tag, depending on the number of mutations called for by the mutation model, either 000000..., 111111..., or 010101... This translated into AAAAAA..., GGGGGG..., or AGAGAG... and appeared at the beginning of any chromosome in the model when it finished running. But because many mutations drifted out of the population (i.e. some men had no living descendants) any column with

no variation was skipped. The FASTA file was imported into the phylogenetics modelling software MEGA (version 7.0.26),²⁶ from which several standard phylogenetic trees could be created. The neighbour-joining method was chosen for this paper due to its simplicity (sequences are grouped into closest pairs, then pairs of pairs are grouped, etc.) and the fact that it makes no evolutionary assumptions within internal branches (as in the case of several other tree building methods). However, alternate tree-building algorithms produced essentially the same results (data not shown).

Results

Figures 3 to 10 were generated from the Model 3 results, but since all three mutation models had identical population parameters, they produced essentially identical results for these basic statistics. In fact, subsequent model runs were highly reproducible.

Due to the nature of exponential growth, even with an age of maturity of 20 years and a 15-year minimum spacing between children, the population still grew rapidly, taking approximately 470 years to reach the pre-determined maximum of 10,000 individuals (figure 3). Increasing the maximum population size did little (it took only 575 years to reach 100,000 individuals). In this model, there is no ‘soft landing’. When the maximum population size is reached, newly born children simply replace existing individuals. This ‘replacement’ model is valid as long as only a small fraction of individuals are replaced each year. Too much replacement and the effects of Patriarchal drive would be masked by the removal of too many older people from the population. Since we know the Patriarchs lived to great ages, obviously they were not ‘replaced’ prior to their recorded age at death. Thus, keeping replacement to a minimum was a necessary compromise between the requirements of the biblical model and available computer processing power.

The number of births, marriages, deaths due to old age, and losses due to replacement in the model over time are given in figure 4. As the average

lifespan drops, more people die each year. This creates more space for new children and necessitates fewer replacements of living individuals over time. The average (± 1 SD), minimum, and maximum lifespans per model year are shown in figure 5. The timing was chosen as a compromise, essentially delaying the time it took to reach maximum population size for as long as possible.

The gradual reduction in lifespan is shown in figure 5. The average number of generations and the average number of paternal generations are shown in figures 6 and 7, respectively, and a histogram showing the range of paternal generations at various model years is given in figure 8.

Figures 9–11 show the most significant results of this project. Figure 9 displays the average number of new

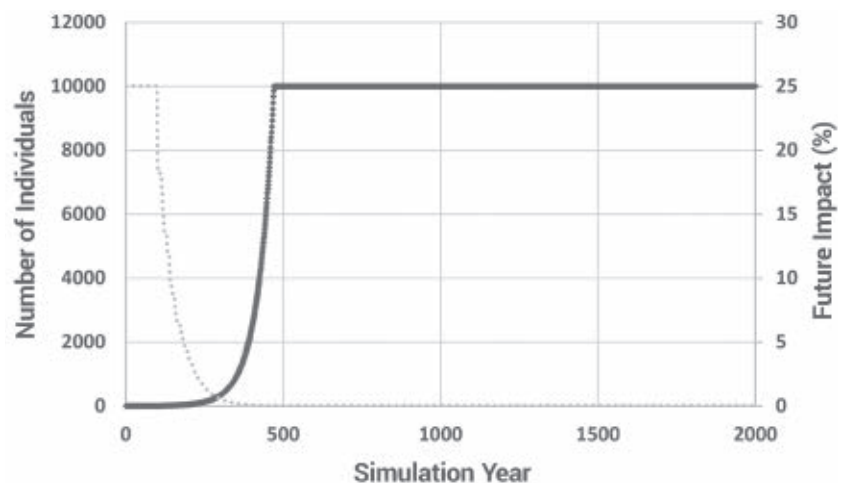


Figure 3. Population size (thick line) and future impact of mutations (thin dotted line) vs time. In all model runs, the population size (n) increased rapidly. At the same time, the potential impact of any new mutation (defined as $1/n$) decreased. Since there are only three men at the beginning of the run, any new Y chromosome mutation in a child born in the first year would make up 25% of the total male population and would be expected to be found in approximately 25% of the future population, regardless of the population size.

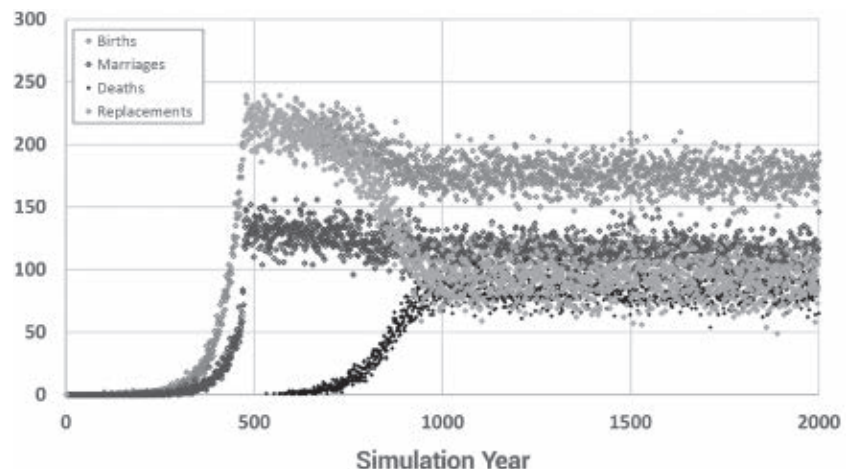


Figure 4. The number of births, marriages, deaths due to old age, and losses due to replacement in the model over time. Replacement first kicks in when the population reaches maximum size, but quickly wanes as the average lifespan declines and the number of deaths due to old age increases.

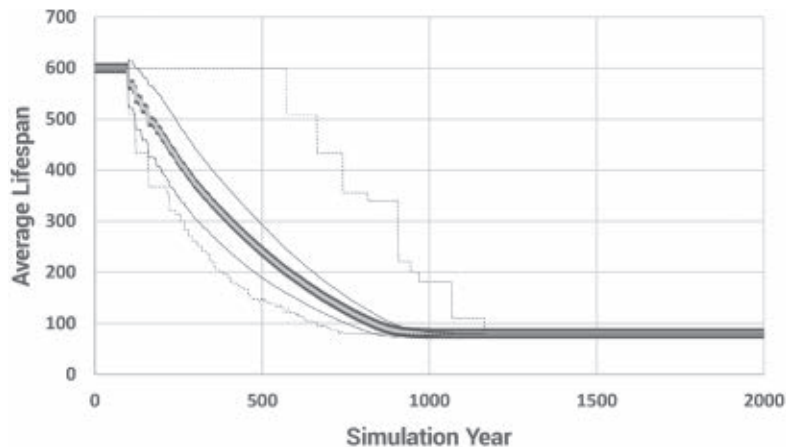


Figure 5. Reduction in lifespan vs time. The average lifespan of all living individuals at each year increment is represented by the thick central line. Bracketing that are ± 1 standard deviations (solid lines) and the longest- and shortest-living individual alive each year (dashed lines). The 100-year delay represents the time between the birth of Shem, Ham, and Japheth and the onset of the Flood.

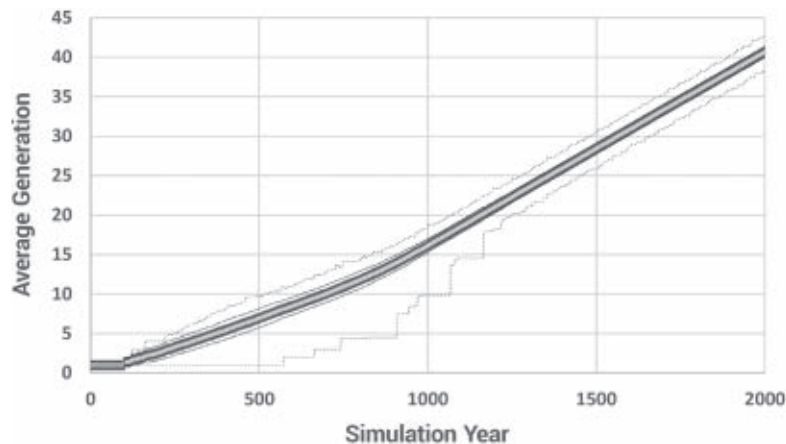


Figure 6. Average number of generations from Noah vs time (thick line), ± 1 standard deviations (solid lines), and the greatest and least number of generations (dashed lines) of all living individuals each year. The number of generations is calculated by incrementing and then averaging the number of maternal and paternal generations.

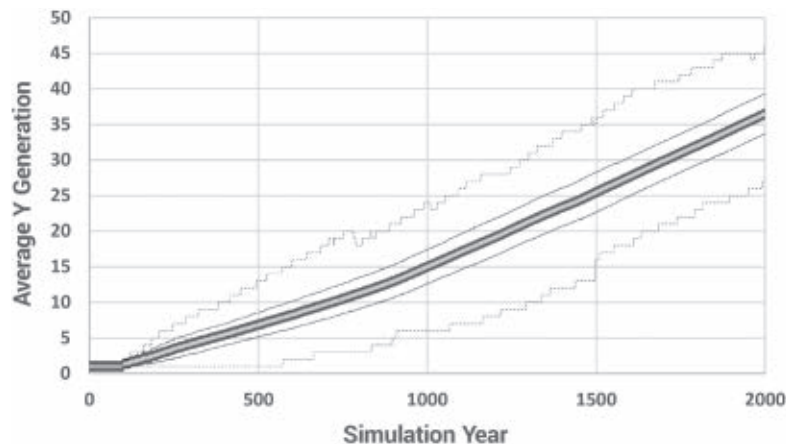


Figure 7. Average number of paternal generations from Noah. Note that the variance at the end of the model run is much greater for the Y chromosome (and, by association, the mtDNA) than for the number of generations overall (figure 6).

mutations entering the population per model year. The total range is much greater than shown. One individual received 210 mutations in year 558 alone, but since the population was so large by then, he had little effect on the average. The stochasticity is caused by the nature of sampling in small populations. In other words, when the population is very small, the average is strongly determined by whether or not a Patriarch has a child that year. But note that the average number of mutations directly translates to average branch length on the phylogenetic tree. These results indicate a strong potential for faster-than-modern mutation accumulation rates in the early post-Flood population. They also tell us to expect variable branch lengths, even among branches rising contemporaneously.

This is more clearly shown in figure 10, where the branch length for every new individual is shown. The data are grouped into irregular time intervals and the point styles adjusted for maximum distinction. The initial generation (Noah to Shem, Ham, and Japheth), would have created three massive new branches 160 mutations long (using mutation model 3). Since the model starts with only three men, 100% of the men carry branches that long at year zero. After that, long branches were continually added, but at extremely low frequencies after year 300. This shows us that long branches can form instantaneously early in the biblical model and then be carried to a significant proportion of the modern population.

However, these results are strongly dependent on the mutation model (figure 11). In fact, since we know nothing about the mutation rates among the long-lived, early post-Flood Patriarchs, we can only draw cautious conclusions.

Figure 12 displays a phylogenetic tree from a small model population. We can see early and deep branching, the result of strong genetic drift, and multiple features that appear similar to figure 1, such as the ‘tufts’ of closely related individuals at the end of long, straight branches. This is a very interesting line of research, but as of now the ability to do this is more of a ‘proof of concept’. It is memory-intensive and generating a tree for 5,000 men that tracks 100,000 or more mutations is near the limit

of most desktop computers. Much more work needs to be done.

Discussion

Mutation accumulation is a real-world problem that must be cracked if we are to develop a working biblical model of human history. Multiple factors contribute to it, but most of the parameters are unknown. The best we can do, then, is to model different possibilities and see how they comport to expectations. Here, patriarchal drive has been shown to be a real possibility and should be incorporated into any basic model of biblical genetics developed in the future. Very old men fathering children in a small but growing population should have a profound effect on the early branching patterns in the Y chromosome family tree. Long branches can and should have formed early in human history, independently of any molecular clock. Yet, the results depend strongly on the mutation model, the rate of population growth, and multiple demographic trends we know nearly nothing about.

The three dissimilar models were chosen for two main reasons. First, they bracket real-world expectations. Second, they show that much more work needs to be done. There is much we simply do not know. However, the results presented here naturally derive from already established population models. No ‘tweaking’ of any parameters was required, other than the development of the dissimilar mutation models. One might be concerned that Model 3 underestimates Model 1 (the uppermost linear model in figure 1) at the maximum model age (600 years). However, the real problem is that Model 1 is not realistic at normal, modern maximum ages (i.e. <100 years). Since we cannot know how many mutations were passed down by the biblical Patriarchs, all we can do is create a range of estimates and hope to improve these estimates with further experimentation.

DNA polymerases make mistakes and mistakes are expected to accumulate over the life of an individual, as the number of cell divisions since fertilization increases. The mutator strain hypothesis,¹⁴ however, is an additional factor that may come into play, but it only partially overlaps the expectations of patriarchal drive. If a small population contains individuals with a defective DNA repair system, for example, the entire population might accumulate many more mutations than expected over a certain time

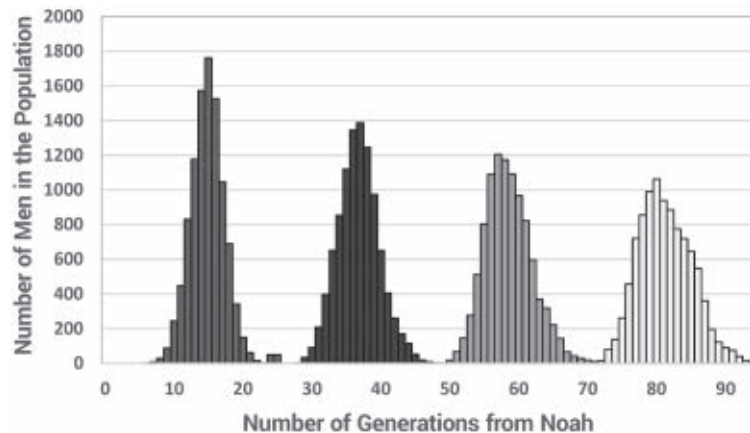


Figure 8. Histogram of the number of generations from Noah at model years 1,000, 2,000, 3,000, and 4,000. Note how the variance is increasing over time. Interestingly, there are a few men at year 3,000 that are as many generations removed from Noah as a very few men at year 4,000. We have both ancient and modern examples of this. Consider that Abraham had visited Egypt 200 years before his grandson, Jacob. Meanwhile, since kings are generally a succession of oldest sons, on the order of 10 generations had passed in the ‘pharaonic’ lineage while only two had passed in the ‘patriarchal’ lineage. Consider also that two grandsons of US President John Tyler (born in 1790) are still alive (cf. Wikipedia.org). Most families have experienced approximately seven generations in that same amount of time.

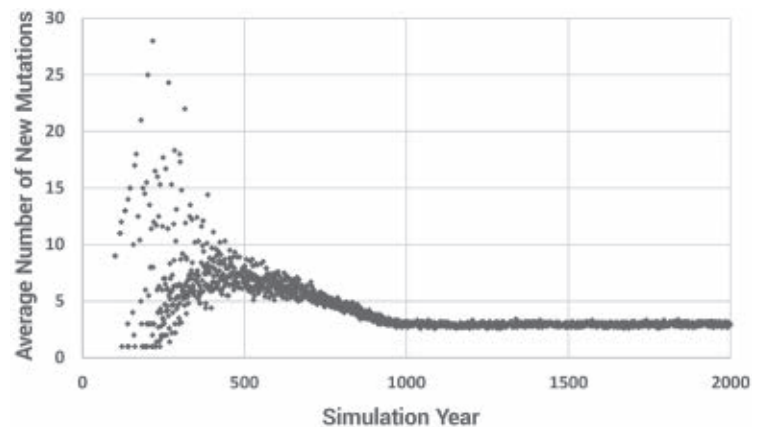


Figure 9. Average number of new mutations per model year

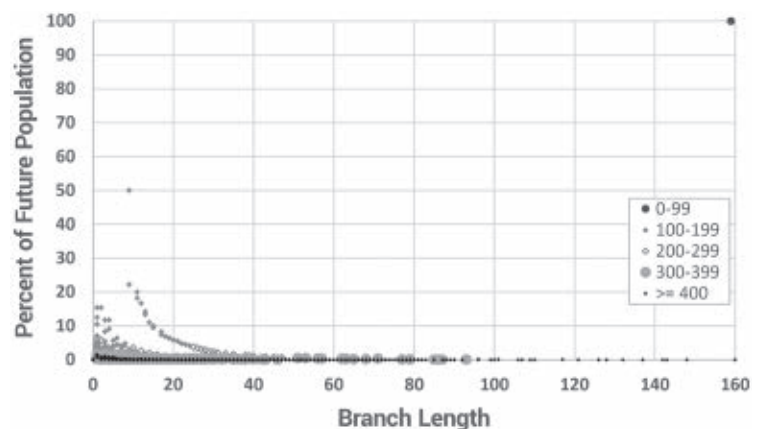


Figure 10. New branch lengths and the expected proportion of the future population expected to carry that branch (using mutation model 3). The data are grouped into arbitrary year ranges.

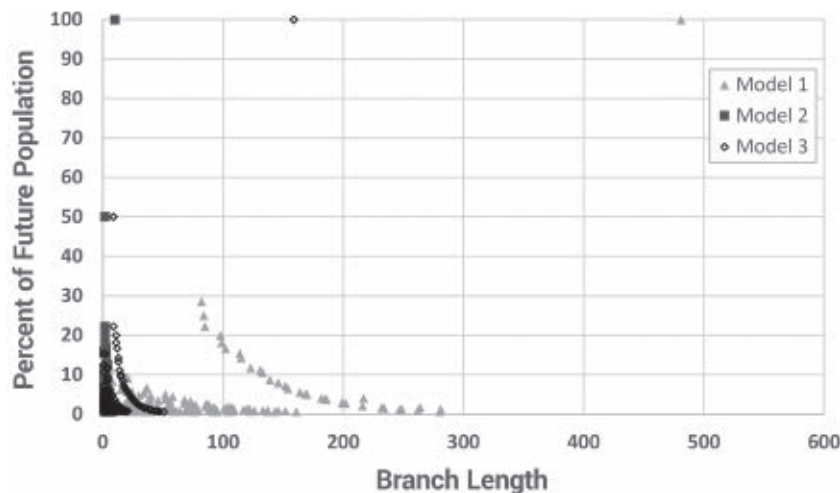


Figure 11. Branch length comparison of the three mutation models over the first 300 model years. This illustrates the strong dependency of branch length on the mutation model.

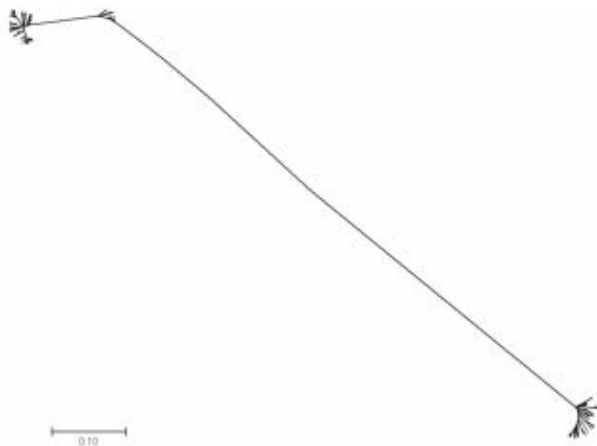


Figure 12. Neighbour-joining phylogenetic tree of modelled Y chromosome data (mutation model 3; $n = 1,000$; max lifespan = 500 years; duration = 1,000 years). This is an extreme example of how genetic drift drives the shape of a phylogenetic tree. There were 503 men alive at the end of the run. Even though 42,138 mutations had occurred, all but 3,334 had drifted out of the population by the end of the run. Noah is located almost exactly in the centre of the longest branch, meaning one of the three starting branches was missing. In the end, the sequences were divided into two main families, each populated by many closely-related individuals. The scale bar represents approximately 333 mutations.

span. Sperm lack DNA repair mechanisms, but DNA repair is active in spermatogonia.²⁷ Thus, damage to Y chromosomes through defects in DNA repair systems can occur at any life stage. Can this explain the discordant lineages found among the click-speaking people groups of Africa (e.g. the Pygmies of the Central African forest and the Khoi-San bushmen of Southern Africa)? It might well explain the presence of haplogroup A00 in Cameroon. When geneticists discovered the Y chromosome of a descendant of Albert Perry (an African slave who lived in South Carolina, US) in a commercial genealogy database, they were surprised. He had

a brand-new branch, never seen before. Searching revealed that very few men in Central Africa carried related lineages which were dubbed A00, the “basal-most” branch among all living men.²⁸ But there is a major problem with this: extremely rare lines should drift out of a population quickly. How could the ‘oldest’ line have maintained itself in a rare state for approximately 200,000 years?²⁹ Mathematically, this makes no sense. Rupe and Sanford showed that nearly all new mutations quickly drift out of a population.¹⁶ The more rare a variant, the more likely it is to be lost due to random chance. All new mutations, by definition, start off in a single individual and are thus maximally rare. In standard population

genetics, the probability of any hemizygous variant becoming fixed is equal to $1/n$. The probability of a variant becoming lost is the converse of this, $1 - 1/n$. Extremely rare lineages, therefore, are not expected to persist for any length of time, yet the A00 line is both extremely rare *and* extremely old? Instead, it is more likely this is a new line that has simply experienced an elevated mutation rate in recent times. This would produce a discordant branch more quickly.

There are other important factors not considered in this paper, but they all should play a part in the global story of mankind. Selective sweeps were not discussed, neither were population surges,¹⁵ but these two factors will dramatically affect what we see. Consider figure 1. There are multiple ‘tufts’ sitting at the end of long branches (e.g. the two E1 and R1 clusters). The beginning of each tuft represents a historical male who had a surprisingly large number of male descendants. Rare but important, or simply lucky, males have produced most of the extant lines. All other lines are extinct. Thus, population surges are a strong driver of the final shape of the tree. Drift and selection are often difficult to tell apart, but in figure 12 strong drift is evident. Nearly all early side branches have gone extinct, leading to two main ‘tufts’ on long, slender branches. Almost all of the remaining individuals are closely related to other individuals and a great mutational distance separated the groups from each other.

Neandertals and Denisovans are also not yet part of this model. There are several reasons for this. First, there is but one partial Neandertal Y chromosome available to date.³⁰ Also, its quality is questionable. Consider figure S11 in the much-discussed paper on ancient Canaanite DNA by Haber *et al.*³¹ Since mutations accumulate in all lineages over time, modern people should have more mutations than ancient people. The most ancient samples should be on the shortest branches. Yet the opposite is true here. This casts a suspicious light on all ancient DNA studies. For example, the long branches we see for the Neandertals and Denisovans

might be artifactual. Second, we need to learn a lot more about inbreeding effects in small populations (Neandertals and Denisovans are the most inbred populations we have ever seen).³² Third, we need to formulate a theory of how they drifted from the root of mankind so quickly.

In the end, we expect a chaotic early history of man. That is, even if the events are fixed in history, it will be very difficult to predict the exact pattern that should result from the starting conditions. The combination of rapid early population growth, patriarchal drive, fragmentation of the population after Babel with the subsequent long-term isolation of some groups and extreme inbreeding in some, population surges and collapses, and selective sweeps (either naturally or through war and conquest) creates a recipe for exactly the type of tree we see, even if the specific tree cannot be predicted. In figure 1 there are deep branches that separate all major lineages, yet there are only a handful of these lineages. The paucity of major lineages indicates that we came from a small population that expanded rapidly. The distance between the lineages suggests patriarchal drive was in effect during the early years of that expansion. How much of an effect this had depends on many factors that have yet to be fleshed out, but patriarchal drive should be considered an important part of the discussion.

References

- Sarfati, J., Biblical chronogenealogies, *J. Creation* 17(3):14–18, 2003.
- Carter, R.W. and Powell, M., The genetic effects of the population bottleneck associated with the Genesis Flood, *J. Creation* 30(2):102–111, 2016; creation.com/images/pdfs/tj/j30_2/j30_2_102-111.pdf.
- Carter, R., Effective population sizes and loss of diversity during the Flood bottleneck, *J. Creation* 32(2):124–127, 2018.
- Carter, R.W., Lee, S.S., and Sanford, J.C., An overview of the independent histories of the human Y chromosome and the human mitochondrial chromosome; in: Whitmore, J.H. (Ed.), *Proceedings of the Eighth International Conference on Creationism*, Creation Science Fellowship, Pittsburgh, PA, pp. 133–151, 2018; creationicc.org/abstract.php?pk=364.
- Xue, Y. *et al.*, Human Y chromosome base-substitution mutation rate measured by direct sequencing in a deep-rooting pedigree, *Current Biology* 19(17):1453–1457, 2009.
- Helgason, A. *et al.*, The Y-chromosome point mutation rate in humans, *Nature Genetics* 47:453–457, 2015.
- Skov, L. *et al.*, Analysis of 62 hybrid assembled human Y chromosomes exposes rapid structural changes and high rates of gene conversion, *PLoS Genetics* 13(8):e1006834, 2017.
- Jónsson, H. *et al.*, Parental influence on human germline de novo mutations in 1,548 trios from Iceland, *Nature* 549:519–522, 2017.
- Crow, J.F., Age and sex effects on human mutation rates: an old problem with new complexities, *J. Radiation Research* 47:Suppl. B75–B82, 2006.
- Walter, C.A. *et al.*, Mutation frequency declines during spermatogenesis in young mice but increases in old mice, *PNAS* 95:10015–10019, 1998.
- Francioli, L.C. *et al.*, Genome-wide patterns and properties of *de novo* mutations in humans, *Nature Genetics* 47(7):822–826, 2015 | doi:10.1038/ng.3292.
- Kaarouch, I. *et al.*, Paternal age: negative impact on sperm genome decays and IVF outcomes after 40 years, *Mol Reprod Dev* 85(3):271–280, 2018 | doi:10.1002/mrd.22963.
- Yoon, S.-R. *et al.*, The ups and downs of mutation frequencies during aging can account for the Apert syndrome paternal age effect, *PLoS Genet* 5(7):e1000558, 2009 | doi:10.1371/journal.pgen.1000558.
- Choi, S.-K., Yoon, S.-R., Calabrese, P., and Arnheim, N., A germ-line-selective advantage rather than an increased mutation rate can explain some unexpectedly common human disease mutations, *PNAS* 105(29):10143–10148, 2008.
- Goreilly, A. and Wilkie, A.O.M., Paternal age effect mutations and selfish spermatogonial selection: causes and consequences for human disease, *American J. Human Genetics* 90:175–200, 2012.
- Carter, R.W., Lee, S., and Sanford, J.C., An overview of the independent histories of the human Y-chromosome and the human mitochondrial chromosome; in: Whitmore, J.H. (Ed.), *Proceedings of the Eighth International Conference on Creationism*, Creation Science Fellowship, Pittsburgh, PA, pp. 133–151, 2018; creationicc.org/abstract.php?pk=363.
- Sanford, J. *et al.*, Adam and Eve, designed diversity, and allele frequencies; in: Whitmore, J.H. (Ed.), *Proceedings of the Eighth International Conference on Creationism*, Creation Science Fellowship, Pittsburgh, PA, pp. 200–216, 2018; creationicc.org/abstract.php?pk=363.
- Rupe, C.L. and Sanford, J.C., Using numerical simulation to better understand fixation rates, and establishment of a new principle: Haldane's Ratchet; in: Horstemeyer, M. (Ed.), *Proceedings of the Seventh International Conference on Creationism*, Creation Science Fellowship, Pittsburgh, PA, 2013.
- Moore, L.T., McEvoy, B., Cape, E., Simms, K., and Bradley, D.G., A Y-chromosome signature of hegemony in Gaelic Ireland, *American J. Human Genetics* 78:334–338, 2006; See also irishtimes.com/news/science/the-genetic-imprint-of-niall-of-the-nine-hostages-1.1771373.
- Zerjal, T. *et al.*, The genetic legacy of the Mongols, *American J. Human Genetics* 72:717–721, 2003.
- Carter, R. and Hardy, C., Modelling biblical human population growth, *J. Creation* 29(1):72–79, 2015; creation.com/population-growth.
- Hössjer, O., Gauger, A., and Reeves, C., Genetic modeling of human history part 1: comparison of common descent and unique origin approaches, *Bio-Complexity* 2016(3):1–15, 2016.
- Hössjer, O., Gauger, A., and Reeves, C., Genetic modeling of human history part 2: a unique origin algorithm, *Bio-Complexity* 2016(4):1–36, 2016.
- Kong, A. *et al.*, Rate of *de novo* mutations, father's age, and disease risk, *Nature* 488(7412):471–475, 2012.
- Hardy, C. and Carter, R., The biblical minimum and maximum age of the earth, *J. Creation* 28(2):89–96, 2014; creation.com/biblical-age-of-the-earth.
- Tamura, K., Stecher, G., Peterson, D., Filipski, A., and Kumar, S., MEGA6: molecular evolutionary genetics analysis version 6.0, *Molecular Biology and Evolution* 30:2725–2729, 2013.
- Gunes, S., Al-Sadaan, M., and Agarwal, A., Spermatogenesis, DNA damage and DNA repair mechanisms in male infertility, *Reprod Biomed Online* 31(3):309–319, 2015 | doi: 10.1016/j.rbmo.2015.06.010.
- Mendez, F.L. *et al.*, An African American paternal lineage adds an extremely ancient root to the human Y chromosome phylogenetic tree, *American J. Human Genetics* 92: 454–459, 2013.
- Elhaik, E. *et al.*, The 'extremely ancient' chromosome that isn't: a forensic bioinformatic investigation of Albert Perry's X-degenerate portion of the Y chromosome, *European J. Human Genetics* 22:1111–1116, 2014.
- Mendez, F.L. *et al.*, The divergence of Neandertal and modern human Y chromosomes, *American J. Human Genetics* 98:728–734, 2016.
- Haber, M. *et al.*, Continuity and admixture in the last five millennia of Levantine history from ancient Canaanite and present-day Lebanese genome sequences, *American J. Human Genetics* 101(2):274–282, 2017.
- Reich, D. *et al.*, Genetic history of an archaic hominin group from Denisova Cave in Siberia, *Nature* 468:1053–1060, 2010.

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The egg—irreducible complexity of creation's perfect package

Jerry Bergman

The anatomy and physiology of an amniotic egg was briefly reviewed to illustrate its irreducible design and the contrast between the amniotic egg type and egg designs for aquatic environments such as fish. The variations of the amniotic egg were also noted, stressing they all had the very same basic design, shape, colour, and size variations. Plausible means of the evolution of the amniotic egg type from fish eggs were explored, finding that almost no evolutionists have ventured to hypothesize evolution in this area largely because of lack of fossil or other evidence and the problem irreducible complexity presents. The egg is an excellent example of irreducible complexity because every component discussed in this review exists in all amniotic egg types, and are all required for the egg to function.

Bird and reptile eggs are irreducibly complex structures designed to enable the embryo to develop into a fetus, then into a fully formed animal outside of the mother's body. Bird eggs are "virtually self-contained life-support systems. All they require for the embryo to develop properly are warmth and oxygen."¹ The eggs in birds, reptiles, insects, mollusks, fish, and monotremes (mammals that lay eggs instead of giving birth to live young), contain an ovum. When the ovum is fertilized it is called a zygote. A zygote is thus a diploid cell resulting from the fusion of two haploid gametes.

The egg serves several functions, including protection and nourishment of the offspring while it develops from one cell to a fully formed young animal able to live in the outside world. The egg covered in this review is the amniotic egg type, named such because the embryo develops inside the amnion, the innermost membrane that encloses the embryo of mammals, birds, or reptiles. This review about amniotic eggs focuses on birds' eggs, but many of the observations also apply to reptile eggs.

The largest known egg of an existing bird is that of the elephant bird (*Aepyornis maximus*) which is about 10 kg, although some extinct dinosaurs had larger eggs. The bee hummingbird produces the smallest bird egg known, which weighs half a gram. Eggs laid by some reptiles and most fish can be even smaller, and those of insects and other invertebrates are much smaller still.

The jelly-like eggs of non-amniotes (aquatic and semiaquatic animals who lay their eggs in water, including fish, amphibians, frogs, and toads) do not have a hard-protective eggshell. Amniotes (animals whose embryo develop in an amnion) include mammals, birds, and reptiles. A few animals, as some turtles, lizards, and snakes, lay soft-shelled eggs, but most lay hard-shelled eggs consisting of hard mineral crystals of calcium carbonate.¹ This review covers only hard-shelled eggs.

A zygote results from the fertilization of an ovum, which develops into an embryo and then a shelled fetus. Animals that lay eggs are *oviparous*, and the study of eggs (and the hobby of collecting eggs, commonly bird eggs) is termed *oology*. The embryo develops from the small germinal disc located on the edge of the egg yolk. The egg's fluid-filled cavity not only buffers the embryo against short-term external temperature extremes, but also cushions it if it is bumped.²

After that the egg matures to the degree that it can be expelled, and in a short time, it is expelled from the mother's body.³ If fertilized, the embryo further develops in the egg until the organism can survive outside. When adequately developed, the fetus breaks out of the egg's shell to begin its life in the outside world, a process called hatching. It may take longer than a day to break out of the egg shell.

The egg's shape

Both protection and nourishment of the offspring are achieved within a striking diversity of egg types and shapes. Hauber classified 600 of the world's bird eggs, noting that each egg is unique.⁴ Furthermore, of the over 10,000 species of birds, many more bird eggs have yet to be described.⁵ A problem is that: "Explanations for both the origin and function of this diversity have remained little more than anecdotal."⁶ Spottiswoode in the journal *Science*, touts the results of research, in which she describes an egg as "the most perfect thing."⁷ In short, she found: "changes in the forces experienced by the shell membrane as the egg develops in the female's oviduct are sufficient to generate the observed egg-shape diversity across all birds,"⁷ a conclusion that only explains the results of the forces on the egg, not the genetics behind the oviduct design that produces the egg shape.

The need is to explain the *origin* of the oviduct design, which is the real issue and one for which no evolutionary



Figure 1. A variety of bird eggs, illustrating the variety existing in both size and colour

explanation is provided. Stoddard *et al.* admit that the “precise physiological mechanisms by which morphological adaptations for flight might affect egg shape are unknown”.⁷ Actually, how such adaptations might affect the shape is unknown, period.

The eggshell

All amniotic eggs have an outer covering called a shell consisting mostly of protein, calcium carbonate (CaCO_3), and various other minerals. The eggs of reptiles, birds, and monotremes (the few mammals that lay eggs, such as the platypus) are laid on dry land. All are surrounded by protective eggshells that can be either flexible, or hard and inflexible as is the familiar chicken egg. A bird’s egg shell is a remarkable piece of engineering. It is very lightweight and has up to 17,000 microscopic pores that allow the chick to breathe oxygen and expel carbon dioxide, which is necessary for bird life.

Although very thin, bird egg shells are extremely strong. They must be strong, otherwise they would collapse when the adult incubates them. The shell is often so strong that it takes some chicks longer than a day to chip their way through it to enter the outside world.⁸ Chicken eggs must be strong enough to resist being fractured from the outside, but weak enough to be broken from the inside when the chick is ready to hatch. As we will now explain, how this is done is nothing short of ingenious.

Development of bird egg shells

The specific details of amniotic eggshell construction vary enormously. For example: duck eggs are oily and waterproof; cormorant (medium-to-large seabirds) eggs are rough and

chalky; tinamou eggs are shiny and very colourful; and emu and cassowary eggs are rough, grainy, and heavily pitted.

Birds’ eggs have a hard calcium-rich shell containing three main layers. As a chick develops in preparation for hatching, these layers become thinner from the inside to the outside. The shell’s necessary strength and other qualities come from its nanostructural design.⁹

One source of the shell’s strength is osteopontin protein which becomes embedded inside the crystal structure that generates the nanostructure to increase its hardness. Osteopontin in turn helps to form a scaffold that guides the development of the calcium-containing mineral assembly arrangement, generating the nanostructure that helps to produce the eggshell layer’s hardness.

Osteopontin protein is also used in the bones of birds to help guide the biomineralization process to give these structures their specific properties. Without this protein, large calcite (calcium carbonate) crystals form. Higher concentrations of osteopontin produce a smaller nanostructure, and consequently a stronger overall structure.

The shell structure surrounding the embryo must be altered towards the end of development to allow the young to hatch. As the embryo develops, the egg shell slowly dissolves, and the calcium taken from the shell is then incorporated into the bird’s skeleton.¹⁰

Focused ion beam research has revealed that the entire eggshell layers are formed from an array of tiny areas packed with the crystalline calcium-containing mineral.¹¹ The layers are smaller and more closely arranged in the outer egg shell layer. The nanostructure also increases in size toward the inner layers. The outside layer with the smallest nanostructure is harder but the inner layers become softer. This design feature was described in one study that stated an eggshell

“... has an unusual combination of mechanical properties (low fracture toughness combined with high Young’s modulus), making it ideally suited as a container for the developing chick, which must be stiff and rigid but also brittle enough to be broken when required.”¹²

When a fertilized chicken egg was incubated for 15 days, the nanostructure of the outermost layer remained unchanged. But, the nanostructure of the inner layers had become smaller in size as a result of calcium carbonate being dissolved in acidic conditions so it could be used in the developing chick’s skeleton. The process is aided by the nanostructure increasing the surface area of the calcium-containing mineral. Thus, the inner portion of the shell dissolves to provide mineral ions for the chick’s body needs, while at the same time weakening the shell enough to be broken by the hatching chick. Some chicks have a temporary egg tooth with which to crack or break the eggshell. A few days after hatching, the egg tooth is no longer needed, and is absorbed by the chick’s body.

The protoporphyrin markings on passerine (generally called perching or song birds) eggs function to reduce shell brittleness by acting as a solid-state lubricant. If insufficient calcium exists in the mother bird's feed, the eggshells may be too thin. Protoporphyrin speckling compensates for the brittleness caused by thin eggshells and varies inversely to the amount of calcium in a bird's diet. For this reason, eggs laid later in a clutch are more spotted than earlier ones because the female's calcium store is increasingly used up with each egg produced.

The egg anatomy

A membrane separates the eggshell from the albumen, or egg white, a gelatin-like substance providing food for the growing embryo. This membrane is a barrier to both desiccation and bacterial infection.¹³ Two layers of albumen exist—a thick albumen layer near the yolk and a thinner layer near the eggshell. Depending on the egg size, albumen accounts for most of an egg's liquid weight, usually close to 66%. Albumen contains more than half the egg's total of 40 different kinds of protein, and a majority of the egg's niacin, riboflavin, magnesium, potassium, and sodium.

The cloudy appearance in the egg white is produced by carbon dioxide in the egg. As eggs age, the carbon dioxide escapes, so the albumen in older eggs is more transparent than that of fresher eggs. Albumen is opalescent until an egg is beaten or cooked which denatures the protein and produces the white colour seen when cooking an egg.

In the centre of the egg is the yolk, a yellow liquid consisting of proteins, fat, cholesterol, vitamins, minerals, and the germ spot, the zygote.¹⁴ Two string-like structures called *chalazae* are located on opposite ends of the egg to anchor the yolk in the thick egg white.¹⁵ The chalazae insure the yolk remains in the same position in the centre of the thick egg white no matter how the egg is turned.¹⁵

The chalazae are in turn attached to the membrane lining the eggshell. Since eggs often roll around and may be turned by the mother, this anchoring system is required to insure the yolk remains on top and so it does not become attached to the shell which would create problems. Otherwise the embryo would slosh around in the liquid albumen which could be detrimental.

How does a chick breathe in the egg?

The small pores in eggshells allow the embryo to obtain oxygen and expel carbon dioxide. The domestic hen's egg has around 7,500 microscopic pores and some other species have as many as 17,000. The pores also allow pathogens to enter, a problem solved in most vertebrate eggs by the production of a rich amount of an antibacterial enzyme called lysozyme. Between the eggshell and the shell membrane is a space called an *air chamber* designed to hold air, allowing the embryo to obtain oxygen. The membranes surrounding these eggs are typical of all amniotes.

As the embryo grows, its primary food at first is the yolk. When the fatty yolk is broken down for energy, water is produced as a by-product to be used by the embryo. When these nutrients are exhausted, the food source becomes the thin albumen. Waste products, such as urea, are collected in a sack called the allantois. The albumen is located around the yolk and consists of two layers. The first is the stringy layer called the thick layer; the second is the more watery layer called the thin layer which supplies the water developing fetuses require.

Eggshell colouration

Eggshell colours exist in an amazing variety ranging from white to bright blue, purple, and even black.¹⁶ Eggshells also display a mixture of colours called spotting. The colour of individual eggs is both environmentally influenced and genetically inherited through the mother, suggesting the gene responsible for egg pigmentation is on the sex-determining W chromosome (female birds are WZ, males ZZ). It was once believed the colour was applied to the shell immediately before laying, but research has shown that colouration is an integral part of shell development, and the same protein is also responsible for depositing calcium carbonate, or the protoporphyrins, when a lack of that mineral exists.

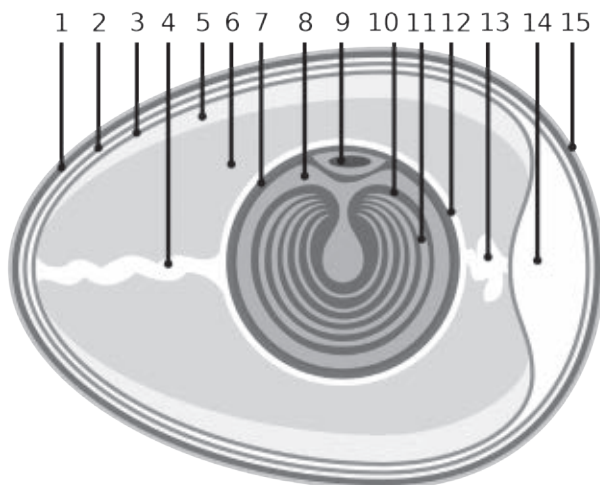


Figure 2. Interior structure of an egg showing its basic parts: 1. eggshell; 2. outer membrane; 3. inner membrane; 4. chalaza; 5. exterior albumen (outer thin albumen); 6. middle albumen (inner thick albumen); 7. vitelline membrane; 8. nucleus of pander; 9. germinal disk (blastoderm); 10. yellow yolk; 11. white yolk; 12. internal albumen; 13. chalaza; 14. air cell; and 15. cuticula.

The default colour of all vertebrate egg shells is white, produced by the calcium carbonate from which shells are constructed. The green or blue colour comes from the pigment known as biliverdin, also found in human bile. A blood breakdown product, it is responsible for the sometimes greenish colour of bruises. A brown, 'earth' colour comes from zinc chelate. Protoporphyrin is an organic compound that produces a reddish-brown colour or a spotting paint colour to the egg.

Many ground-nesting birds use egg markings for camouflage. In species which nest in large groups, such as the guillemot (*Uria aalge*), each female's eggs have very different markings to allow them to identify their own eggs on the crowded cliff ledges on which they breed. Examples include the Charadriiformes, a diverse order of small to medium-large birds that includes gulls, terns, plovers, and sandpipers, most of which live near water.

Brood parasitism

When one bird species lays its eggs in the nest of another it is called bird brood parasitism. Some brood parasitic birds, such as cuckoos, have egg colouration that matches the passerine host's eggs. Passerines are perching birds or, less accurately, songbirds which include more than half of all bird species. In some cases, the host's eggs are removed or eaten by the female, or expelled from the nest by her chicks. Brood parasites include the cowbirds and many Old-World cuckoos. Most passerines lay coloured eggs, even if there is no camouflage requirement for cryptic colours (colouration designed for camouflage, from *crypsis* meaning hiding).

The egg shape design

Most bird eggs have an oval shape, with one end rounded and the other end slightly more pointed. This shape results from the egg being forced through the bird's oviduct by muscles that contract behind the egg, pushing it forward. The egg's wall is often still slightly malleable even when expelled, and the more pointed end forms at the back. Cliff-nesting birds often have highly conical eggs because this egg design makes it less likely to roll off the cliff. Instead, they roll around in a tight circle. In contrast, many hole-nesting birds tend to have nearly spherical eggs.

Egg development in the hen

The details of the egg development in the body of the chicken are largely unknown except that it is a complex, delicate process. The general steps are known, but few details are. The chicken egg begins as an oocyte produced by the hen's ovary in a process called ovulation. The hen has two

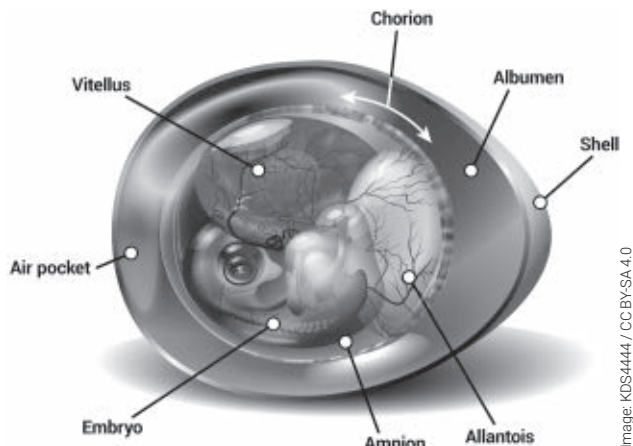


Figure 3. The development of the chick at its 9th day

Image KDS4444 / CC BY-SA 4.0

ovaries with the right ovary producing hormones and the left one producing eggs. This ovary contains all the undeveloped eggs the hen was born with, limiting the maximum number of eggs she can lay in her lifetime.

The oocyte is released into a long, spiralling tube in the hen's reproductive system called the oviduct where it may be fertilized internally by a sperm. The two-foot-long oviduct consists of several compartments, each with a different function; the two main ones will be described here. The oviduct performs various duties throughout the process similar to an assembly line with different sections performing different tasks. The first section of the oviduct assembly line, called the magnum, is where the first layer of egg whites that cover the yolk are formed. Whether or not it is fertilized, it continues down the oviduct where it is coated with the vitelline membrane, structural fibres, and added layers of albumin.

The egg is also plumped up with fluid until it achieves the approximate shape required. The next stop on the line is the isthmus where the inner and outer membranes of the shell are formed around both the yolk and the two white layers described above. As the egg travels down through the oviduct, it is continually rotating within the spiralling tube. At this part of the journey antibiotics are produced to protect the egg yolk and the 'whites' from bacteria.

In the shell gland, the egg is sealed within a hard shell just before it is laid. The shell consists primarily of calcium carbonate crystals as covered above. Also, just before the egg is laid, a natural antibacterial coating is added to the outer shell. This antibacterial substance called the 'bloom' protects it from potentially harmful bacteria.

A hen's body temperature is about 41°C, so when the warm egg is laid it rapidly cools to ambient temperature, creating an air space between the two shell membranes. Because of this a fresh egg will sink in water, while older eggs with larger air spaces will float—providing a good way

for determining if an egg is fresh. This egg formation system will not produce viable eggs unless all of these steps are in place. If any step is defective, the entire system will fail and the hen will not be able to reproduce.

Dinosaur eggs

Many types of dinosaur eggs exist, based mostly on their shell traits such as size, texture, shape, and even their microscopic traits.¹⁷ An evaluation of the many thousands of dinosaur eggs so far discovered shows they are of similar or even greater complexity than modern bird eggs. Stereo electron microscope study was able to determine that their shell, as is true of all birds, consists of a minimum of two layers. Many studies of dinosaur eggs show no evidence of evolution from ancient shelled eggs to modern eggs.¹⁸

No evidence of animal egg evolution

The most authoritative compendium on the science of hard-shelled eggs notes this “highly functional reproductive system ... is a compact and adaptable product of evolution engineering” but in 565 pages not only includes no evidence of its evolution, but never even mentions the theory again.¹⁹ Although no evidence exists for the evolution of animal eggs from non-eggs or even ancient eggs to modern eggs, some speculation exists. Packard and Packard postulate:

“Evolution of the avian egg from the naked, amniotic egg of ancestral reptiles probably was the outcome of intense predation by soil invertebrates and microbes on a highly integrated and coadapted complex of characters. The calcareous shell, which from its inception afforded a measure of protection to eggs against attacks by soil organisms, became progressively thicker and more complex in the face of continuing selection for antipredator devices.”²⁰

The authors note a problem with what they admit is only a plausible conceptual model, one which they acknowledge dates back to 1928 and is limited by “the meager body of evidence presently available”.²¹ This model was proposed to account for the evolution of cleidoic (amniotic) eggs. It is part of the theory of how birds evolved from reptilian progenitors, and includes the problem that

“... increases in thickness and complexity of eggshells led to simultaneous reductions in the amount of liquid water that could be absorbed by incubating eggs from the substrate. Because embryos initially were dependent upon uptake of substantial quantities of water from the environment to satisfy their needs for this solvent, adaptive increases in thickness of the eggshell required coupled increases in the amount of water contained by eggs at oviposition.”²²

Other problems include that the egg shell alone would not offer much protection because, for the chick to survive, it must be able to take in oxygen and expel carbon dioxide. Critical to protection from bacteria are the antibacterial defences which now exist in egg design. I was not able to locate any other attempt to explain the evolution of amniotic eggs, nor could I find a follow-up to the Packard article.

The evidence of sexual reproduction involving the production of eggs has “continued, unaltered in essentials, almost since animal life began”.²² Other than this, little else can be said about egg evolution except: “Whatever the reason for the evolution of sex, it is found at all levels of the animal kingdom and the egg in its many forms is its manifestation.”²³

Many fossil eggs have been found, especially dinosaur eggs, but as noted, as far as can be determined from the abundant number of fossils found, eggs have always been close to identical to modern egg types. Chicken eggs are clearly Irreducibly Complex. All of the parts including the shell system, the air cell, the outer and inner membranes, the albumen, the vitelline membrane, and even the chalazae, and of course the embryo, must exist as a unit for the first egg system of life to survive.

Theories of bird egg evolution have been limited to attempting to explain the evolution of small details, such as a theory of the evolution of the egg size, the egg shell colour or nesting traits appearance.²⁴ Although these theories all begin with an existing fully developed egg, even here not much success has been achieved. After an extensive study testing various theories put forth to evaluate bird shell colour variations, one researcher concluded it is difficult

“... to account for the evolution of egg pigmentation and difficult to judge the extent to which pigmentation is constrained by phylogeny. There is little indication that specific egg colours evolved primarily to signal their noxiousness to predators, or female quality to birds that will assist with chick rearing, though it is possible that particular egg colours have been co-opted secondarily by individual species to serve these functions. Nor does it seem likely that brood parasitism favours the evolution of either specific egg colours or elaborate patterning. The most plausible general explanation for egg pigmentation remains Wallace’s (1889) hypothesis, that deviations in egg colour and patterning from the ancestral white have been selected primarily for their cryptic appearance.”²⁵

It is even difficult to create a just-so-story of the evolution of the bird egg. In the evolution of the vertebrate eye design that included an iris, a circular lens, a gel-filled vitreous cavity, pigment, and photoreceptor cells which are connected by the optic nerve to the brain, at least a possible scenario can be created, although when examined in detail it utterly fails.²⁶ Taylor postulated the bird egg evolved from reptile eggs, which he notes are only slightly different.²⁷ He

then opines the reptile egg in turn evolved from fish eggs which consist of millions of complex cells that are structurally close to large blobs of jelly, producing a major gap between them and amniotic eggs.²⁸

Fish eggs are designed to thrive in water, but the yolk of land animals must be protected and nourished by a privately contained pool of water and nutrients surrounded by a shell that allows gas exchange to take place. Thus, evolutionists believe the amniotic egg evolved, but “evolutionists have no idea how the” avian

“... egg could have evolved. All they can tell us is the reptile egg is similar to it and it is supposed to have appeared first. This, of course, only throws the problem back one stage. They cannot even say *when* the evolution of the egg might have happened ... the fossil record is blank just when we need it.”²⁸

The egg innovation was a critical step for Darwinism because it allowed life to move from the water onto the land. From there, modern evolutionists argue, evolved reptiles, dinosaurs, and mammals. Thus, here we have a chasm for which, as Taylor noted, we have no idea how and when this drastic change occurred.

Hayward has reviewed the attempts to explain this gap and concluded the existence of a bird’s egg is a big miracle, and just as much of a problem for Darwinists as the origin of its wings.²⁹ Prof. Marc McKee commented on the egg design, noting “we should be making materials that are inspired by nature and by biology because ... it is really hard to beat hundreds of millions of years of evolution in perfecting something.”³⁰ Of course, no evidence exists of its evolution but enormous evidence exists of its irreducible design.

References

1. Cullen, P., The fracture toughness of eggshell, *Acta Biomaterialia* **37**:21–27, 2016.
2. Burley, R.W. and Vadehra, D., *The Avian Egg: Chemistry and biology*, Wiley-Interscience, New York, 1989.
3. Davis, N., Scientists solve eggshell mystery of how chicks hatch, *The Guardian Weekly*, theguardian.com/science/2018/mar/30/scientists-solve-eggshell-mystery-of-how-chicks-hatch, 30 March 2018.
4. Hauber, M., *The Book of Eggs: A life-size guide to the eggs of six hundred of the world’s bird species*, University of Chicago Press, Chicago, IL, p. 28, 2014.
5. Hauber, ref. 4, p. 31; Cusick, D. and O’Sullivan, J., *Animal Eggs: An amazing clutch of mysteries and marvels*, Early Light, Waynesville, NC, 2011.
6. Spottiswoode, C.N., The most perfect thing, explained, *Science* **356**(6344):1234–1235, 2017; p. 1234.
7. Stoddard, M., et al., Avian egg shape: form, function, and evolution, *Science* **356**(6344): 1249–1254, 2017; p. 2153.
8. Amery, H., *The Natural World*, Golden Books, New York, p. 30, 1994.
9. Athanasiadou, D. et al., Nanostructure, osteopontin, and mechanical properties of calcitic avian eggshell, *Science Advances* **4**(3):30, 2018.
10. Hauber, ref. 4, pp. 14–15.
11. Athanasiadou et al., ref. 9, p. 4.
12. Taylor, D. et al., The fracture toughness of eggshell, *Acta Biomater* **37**:21–27, 2016.
13. Hauber, ref. 4, pp. 14, 31.
14. Hauber, ref. 4, p. 14.
15. Budai, J.G., *What’s in an Egg?* Master Books, San Diego, CA, p. 12, 1980.
16. Cusick, D. and O’Sullivan, J., *Animal Eggs: An amazing clutch of mysteries and marvels*, Early Light, Waynesville, NC, 2011.
17. Chiappe, L. and Dingus, L., *Walking on Eggs*, Scribner, New York, p. 85, 2001.
18. Grine, F. and Kitching, J.W., Scanning electron microscopy of early dinosaur eggshell structure: a comparison with other rigid sauropsid eggs, *Scanning Microscopy* **1**:615–30, 1987. Jackson, F., Schweitzer, M., and Schmitt, J., Dinosaur eggshell study using scanning electron microscopy, *Scanning* **24**:217–223, 2002.
19. Hauber, ref. 4, p. 15.
20. Packard, G. and Packard, M.J., Evolution of the cleidoic egg among reptilian antecedents of birds, *American Zoologist* **20**:351–362, 1980.
21. Packard and Packard, ref. 20, p. 351.
22. Burton, R., *Eggs: Nature’s perfect package*, Facts on File, New York, p. 10, 1987.
23. Burton, ref. 22, p. 12.
24. Kilner, R.M., The evolution of egg colour and patterning in birds, *Biological Reviews* **81**(3):383–406, 2006.
25. Kilner, ref. 24, pp. 397–398.
26. Bergman, J., Is the inverted human eye a poor design? *J. American Scientific Affiliation* **52**(1):18–30, 2000; Bergman, J., Did eyes evolve by Darwinian mechanisms? *Creation* **22**(2):67–74, 2008.
27. Taylor, G.R., *The Great Evolution Mystery*, Harper & Roe, New York, p. 63, 1983.
28. Hayward, A., *Creation and Evolution: Rethinking the evidence from science and the Bible*, Wipf & Stock, Eugene, OR, p. 48, 2005.
29. Hayward, ref. 28, p. 48–49.
30. Davis, ref. 3, p. 2.

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Blood test used to prove evolution fails

Jerry Bergman

The rise and fall of the once-major evidential proof of evolution, the blood precipitin test, was reviewed. Although creationists successfully argued against the theory as early as 1925, it was used in the textbooks as a major proof of evolution as late as 2014.¹ This is one more example of the many once-common evidences for Darwinism that have now been discarded due to advancing knowledge as documented by various recent articles and books.²

Because blood is critical for life, and blood traits vary in many life-forms, these differences that enable making blood comparisons were once used as an important ‘proof’ of evolutionary relationships.³ Evolutionists for decades claimed blood similarity was strong evidence that certain animals evolved from other animals, or that they both had a common ancestor. The test used to measure blood homology was the precipitin test, also called the serological test. A precipitate is formed when a chemical reaction occurs and a new compound precipitates out of solution, producing a solid that can easily be seen in the solution either above or below the clear or coloured liquid called the supernatant.

The test used comparisons of blood serum and other bodily fluids to determine evolutionary closeness of the two life-forms tested. Professor Nuttall of Cambridge University first developed a human blood test that formed the basis for the tests now still used in several different disciplines, including criminal investigation⁴

If an antibody binds to an antigen on blood cells, a precipitate forms. If the antibody binds poorly or not at all, no precipitate will form. To determine specifically how close an animal is to humans, the test evaluates the *amount* of precipitate produced in animal blood when adding blood antibodies that were produced to react to human blood.⁵

The theory was based on the belief that the *closer* the evolutionary relationship of the animal tested to humans, the *greater* the level of precipitate formed.⁶ No precipitate forms when human blood antibodies are mixed with reptile blood, and a slight precipitate forms when blood antibodies are mixed with bird blood or other animals that are judged by evolutionists to be evolutionarily closer to humans than reptiles, but still ‘low’ on the theoretical evolutionary scale.

When antibodies designed to react to human blood are added to the blood of creatures that are purportedly evolutionarily *close* to humans, such as monkeys, gorillas, and chimpanzees, a *larger* amount of precipitate forms. Furthermore, evolution theory would predict more precipitate with chimpanzee than baboon blood. If this occurs, the test then supports the evolutionary teaching that humans are evolutionarily closer to chimpanzees than to baboons.⁷

As described by one popular biology textbook, this blood homology test produced one of the most important evidences of evolutionary relationships due to the fact that the more closely related “one animal is to another, the more nearly alike will be their blood proteins”.⁸ The test was even used to help determine the evolutionary closeness of animals that could not be determined by other methods.⁹

How the test works

When blood from an animal is injected into a different kind of animal, the white blood cells respond by producing specific proteins called *antibodies*. Antigens are proteins located on many cell structures, including blood cells, that are used by the immune system as identification marks to determine self-cells from foreign cells. For the test, the antibodies designed to react with human blood combine with the human antigen causing a clumping or separation from the liquid plasma called agglutination, a form that is visible to the naked eye.¹⁰

If the antibody that combines with human blood is placed into a container with rabbit blood, the rabbit blood antigens are close enough to human blood that the antigens and antibodies combine to cause the blood to precipitate out of the blood plasma solution. The assumption was that the closer the animal’s evolutionary relationship was to humans, the greater the agglutination level that will occur.¹¹ Thus, the greater the precipitate that occurs, because more antigens and antibodies will combine. And the

“... more alike the blood of the test animals, the closer the [evolutionary] relationship. By injecting a series of rabbits with serum from different species, it has been possible to obtain a series of antibodies. Each of the antibodies is specific for the blood proteins of one kind of animal. Many thousands of tests have been performed. The results show that cats, dogs, and bears are more closely related to one another than they are to other mammals. Sheep, deer, antelope, goats, and cows are closely related to one another, but not so closely related to bears, dogs, and cats.”¹²

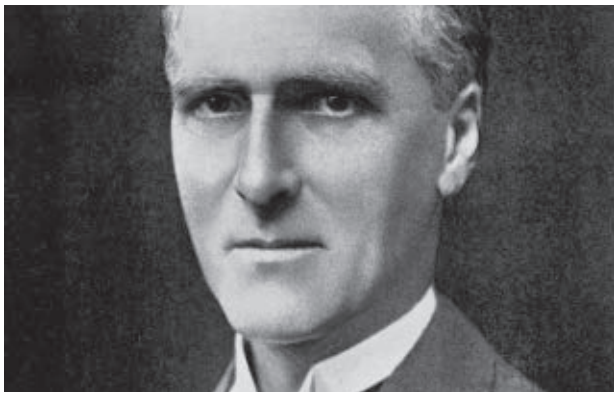


Figure 1. Sir Arthur Keith was a leading evolutionist who, as president of the Royal Anthropological Institute, was very influential in supporting the blood precipitin test, once a major proof of evolution. Support by prominent Darwinists such as Keith were an important reason in its early acceptance.

The test's accuracy

Sir Arthur Keith (figure 1) concluded that the test was “a trustworthy and exact method of determining the affinity [evolutionary closeness] of one species of animal to another”.¹³ Harvard’s Ernest Hooton concluded that homology measured by blood tests alone provided sufficient proof to establish human evolution as fact, writing that “if there were no evidences of human evolution other than those provided by zoological classification and blood antibody test[s]”, these two methods

“... alone would be sufficient to convince every impartial thinker that man and the anthropoid apes have evolved from some common ape-like ancestor ... from a knowledge of the morphology and physiology of the anthropoid apes and of the lower primates, Huxley’s scientific Saturnians would be driven to postulate the existence of man. For man is logically the next evolutionary step beyond the gorilla and the chimpanzee, or perhaps one should say the next *jump*.”¹⁴

Professor Gordon Alexander, chair of the Department of Biology at the University of Colorado wrote in his biology textbook that “the most striking line of physiology evidence for organic evolution is that provided by *serology* ... based on the antigen-antibody reaction [emphasis in original].”¹⁵ Professor of Biology at Denison University, Arthur Lindsey, wrote in his popular zoology text that

“... the method is capable of yielding far more accurate evidences of detailed [evolutionary] relationship[s] than Nuttall secured ... and furnish[ing] more precise evidences of the relationships indicated by other taxonomic procedure[s].”¹⁶

Professor Lindsey concluded that in “the field of evolution” the precipitin test has become “an even more convincing evidence of the graded relationship of living things” than almost any other measure.¹⁷ The test to document evolution is also found on biology class outlines such as those at

University of Texas, Dallas.¹⁸ Moreover, Presbyterian minister Floyd Hamilton in his article defending evolution called “the precipitin blood test ... one of the most recent and widely heralded lines of proof for evolution”, which was important in his acceptance of Darwinism.¹⁹

Problems develop in the test results

One early test rated old-world monkeys eight parts away from humans, and new-world monkeys 22 parts away. This specific finding and many others fit the evolution model,²⁰ but as more and more comparisons were completed, a large number of findings did not support evolution theory. An example is the discovery that sheep and horses were separated by only three parts. However, when comparing different kinds of apes to humans, the gorilla test produced *less* precipitate than human blood, and chimpanzee blood produced *more* precipitate than human blood! Consequently, this blood test would indicate that humans are a link *between* gorilla and chimpanzee! Pigs and hyenas were found to be closely related to just about every animal that was tested.²¹

In addition, the test results often depended on which specific example of an animal type was used in the test. One test of five different horses found one horse was related to only sheep and other horses, while another horse of the same breed was related to man, cat, hog, seal, pig, sheep, and several other different animals. The next horse tested produced an even different pattern.²²

As the exceptions piled up, the test eventually was abandoned, relegating yet another ‘proof’ of evolutionary naturalism to the scrapheap. Nuttall himself obtained enough negative results that he believed some common problem, such as the manner of death of the animal or the method of blood withdrawal, was causing incorrect results in a large number of cases.²³ We now know that these factors could not affect the test results, only the antigen specifics of the blood sampled does. Also, there exist in humans and in many primates different types of blood groups, the most common ones in humans being A, B, AB, and O (figure 2), plus Rh+ and Rh- types. So far a total of 36 human blood group systems and 346 blood antigens are now recognized by the International Society of Blood Transfusion, virtually all of which are not of major importance in blood compatibility typing.²⁴ Chimpanzee blood is grouped using the V-A-B-D and R-C-E-F systems, which are counterparts of the human MNS and Rh-Hr blood group systems. Yet other systems are involved in other mammals.²⁵

The similarity of blood, or any other body organ or part, does not in itself ‘prove’ evolution, only that a specific design has been reused by the Creator, often because it works perfectly well or because no need exists to modify it. A survey of biology textbooks published before 1960 found the blood precipitation test was often discussed in great detail, but biology and evolution texts published after the 1990s

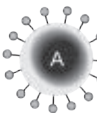
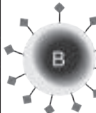
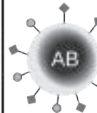
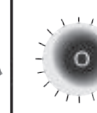






	Group A	Group B	Group AB	Group O
Red blood cell type				
Antibodies in Plasma	 Anti-B	 Anti-A	None	 Anti-A and Anti-B
Antigens in Red Blood Cell	 A antigen	 B antigen	 A and B antigens	None

Figure 2. Human ABO blood groups

rarely mention this specific, now totally discredited, test. Yet some references still cover this long-discarded test.²⁶ An understanding of the many past blunders of evolution serves an important lesson today because it questions how many ideas currently accepted by evolutionists today are also false.²⁷ The test does support the creation view that each different animal kind was created separately and the test is one more proof of that conclusion.

A revised form of the test is still used today.²⁸ This far more complicated test also has some of the same problems. It goes by the term *immunological* testing, which is the topic of another paper. One short example is, as expected, human vs human test found 100% similarity according to the test; man vs chimpanzee found 97%, as expected; man vs baboon found 50%, not even close; and, man versus dog found 0%, which would not be expected, since they are both mammals.¹⁸ The problem is that the chimp fits the evolution prediction, but the baboon value should be very close to the chimp.

Conclusion

The lesson from this once-promising, scientific evidence of evolution, as was true of Piltdown Man, is why did it require several decades to disprove? This case encourages caution in accepting other now-popular evidences of Darwinism. It is also another example of the tendency to uncritically accept evidence that supports our worldview, and reject other evidence that does not. In the end, our worldview should follow the evidence and not the other way around, as occurred in the blood precipitin test case. This is only one example of many others documented in reference 2.

References

1. Zain, C., *Natural Alchemy: Evolution of life*, Cofl Press, Los Angeles, CA, pp. 134–135, 2014.
2. Guliuzza, R., *Twenty Evolutionary Blunders*, ICR, Dallas, TX, 2017; Bergman, J., *Evolution's Blunders, Frauds and Forgeries*, Creation Book Publishers, Powder Springs, GA, 2017.
3. Brown, A., *Evolution and the Blood-Precipitation Test*, Glendale News, Glendale, CA., 1947.

4. Nuttall, G., *Blood Immunity and Blood Relationships*, Cambridge University Press, Cambridge, 1904.
5. Davidheiser, B., *Evolution and the Christian Faith*, Presbyterian and Reformed Publishing, Nutley, NJ, pp. 272–279, 1969.
6. Kenoyer, L., Goddard, H., and Miller, D., *General Biology*, 3rd edn, Harper, New York, p. 516, 1953.
7. Moody, P.A., Evolution as seen in serological tests; in: *Introduction to Evolution*, 3rd edn, Harper, New York, p. 106, 1970.
8. Frazier, R. and Smith., H., *The Biological Sciences: Investigating man's environment*, Laidlaw Brothers, River Forest, IL, p. 442, 1974.
9. Kenoyer *et al.*, ref. 6, p. 516.
10. Alexander, G., *General Biology*, Crowell, New York, p. 816, 1956.
11. Lindsey, A., *Principles of Organic Evolution*, Mosby, St Louis, MO, p. 105, 1952.
12. Frazier and Smith, ref. 8, pp. 442–443.
13. Keith, A., *Concerning Man's Origin*, C.P. Putnam's Sons, New York, p. 24, 1928.
14. Hooton, E., How blood tells; in: *Up from the Ape*, Macmillan Co., New York, pp. 46–47, 1931.
15. Alexander, ref. 10, pp. 815–816.
16. Lindsey, ref. 11, pp. 105–106.
17. Lindsey, ref. 11, p. 107.
18. Dun, D., All living things evolved from a common ancestor: evidence for evolution, Lecture Outline 17, utdallas.edu/~cirillo/nats/day17.htm, accessed 7 November 2018.
19. Hamilton, F., Modern aspects of the theory of evolution, *The Princeton Theological Review* 24(3):396–448, 1926; p. 437.
20. Scott, W.B., Evidence from blood tests; in: Newman, H.H., *Evolution, Genetics and Eugenics*, University of Chicago Press, Chicago, IL, p. 73, 1933.
21. Davidheiser, ref. 5, p. 277.
22. Davidheiser, ref. 5, p. 274.
23. Davidheiser, ref. 5, p. 273.
24. Storry, J.R. *et al.*, International society of blood transfusion working party on red cell immunogenetics and terminology: report of the Seoul and London meetings, *ISBT Science Series* 11(2):118–122, 2016.
25. Socha, W.W., Blood groups of apes and monkeys: current status and practical applications, *Labatory, Animal Science* 30:698–702. 1980.
26. Nelson, B., *After its Kind: The first and last word on evolution*, 4th edn, Miriwal Books, New York, p. 28, 2017.
27. *In search of History: Hoax of the Ages, Piltdown Man*, History Channel, New York, 1996.
28. Boyden, A., Precipitin testing and classification, *Systematic Zoology* 12(1):1–7, 1963.

Jerry Bergman has nine academic degrees, including 5 masters and two PhDs. His major areas of study for his graduate work include anatomy and physiology, biology, chemistry, and psychology. He has graduated from Wayne State University in Detroit, Medical University of Ohio in Toledo, University of Toledo and Bowling Green State University. A prolific writer with over a thousand publications to his credit, including 43 books and monographs, Dr Bergman has taught biology, microbiology, anatomy and physiology, chemistry, biochemistry, geology, astronomy and psychology at the college level. Now retired, he has taught at The University of Toledo Medical College, The University of Toledo, Bowling Green State University and other schools for a total of close to 50 years.

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